

1951

QUEENSLAND

**FIFTY-FIRST ANNUAL REPORT OF THE BUREAU
OF SUGAR EXPERIMENT STATIONS**



REPORT OF THE DIRECTOR

TO

THE HON. THE SECRETARY FOR AGRICULTURE AND STOCK

(As required by "The Sugar Experiment Stations Acts, 1900 to 1951")

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J. R. BURGE, Asst. to Analyst, Brisbane.
F. SHORT, Laboratory Attendant.

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J. C. SKINNER, B.Sc. Agr., Research Scholar, Overseas.
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H. G. KNUST, Senior Adviser in Cane Culture, Bundaberg. (Address: P.O. Box 138; Phone: 228.)
G. A. CHRISTIE, Q.D.A., Senior Adviser in Cane Culture, Ayr. (Address: P.O. Box 28 Brandon; Phone: Brandon 45.)
C. G. STORY, Q.D.A. Senior Adviser in Cane Culture, Mackay. (Address: Experiment Station; Phone: 17.)
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S. O. SKINNER, Q.D.A., Senior Adviser in Cane Culture, Innisfail. (Address: P.O. Box 630; Phone: 271.)
N. McD. SMITH, Q.D.A., Adviser in Cane Culture, Nambour. (Address: C/o Department Agriculture, Nambour; Phone: 175.)
O. W. D. MYATT, Q.D.A., Adviser in Cane Culture, Bundaberg. (Address: P.O. Box 138; Phone: 228.)
E. V. HUMPHRY, Q.D.A., Experimentalist, Ayr. (Address: P.O. Box 519, Ayr.)
E. A. PEMBROKE, Q.D.A., Adviser in Cane Culture, Meringa. (Address: P.O. Box 122 Gordonvale; Phone: Gordonvale 95.)
C. A. REHBEIN, Dip. Sugar Chem., Field Asst. Bundaberg.
C. L. TOOHEY, Dip. Sugar Chem., Field Asst., Mackay.
N. G. GRAFF, Dip. Sugar Chem., Field Asst., Innisfail. (Address: P.O. Box 630.)
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D. R. L. STEINDL, B.Sc. Agr., Pathologist, Brisbane.
G. WILSON, B.Sc., Entomologist, Meringa. (Address: P.O. Box 122 Gordonvale; Phone: Gordonvale 95.)
B. E. HITCHCOCK, B.Sc. Agr., Asst. to Entomologist, Meringa.
Miss J. M. BARROWMAN, B.Sc., Technical Asst., Brisbane.
B. T. EGAN, Asst. to Pathologist, Brisbane.

Division of Mill Technology.

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L. R. BRAIN, B.Sc. App., Assistant Mill Technologist, Bundaberg.
B. G. ADKINS, B.Sc. App., Assistant Mill Technologist, Bundaberg.
A. D. DOOLAN, Dip. Sugar Tech., Technical Assistant, Brisbane.
A. G. CLAIRE, B.Sc. App., Assistant Mill Technologist, Bundaberg.
K. J. YORE, B.E. (Mech.), Assistant Engineer, Brisbane.

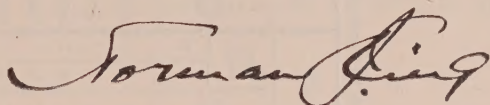
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FIFTY-FIRST ANNUAL REPORT OF THE BUREAU OF SUGAR EXPERIMENT STATIONS

TO THE HONOURABLE THE SECRETARY FOR AGRICULTURE AND STOCK

Dear Sir,—I have the honour to present the Fifty-first Annual Report of the Bureau of Sugar Experiment Stations, covering the period from 1st July, 1950, to 30th June, 1951.



8th October, 1951

Director.

Director's Report

GENERAL

The 1950 crushing season has been described as one of frustration to growers and millers alike. Even before the mills had begun treatment of the crop which had been estimated at over seven million tons—an all time record—unseasonal rains made field conditions so difficult for harvesting that crushing dates had to be postponed in some cases for weeks. In other areas where the scheduled start was made it was found impossible to maintain cane supply and mills were compelled to close down for varying periods until field conditions showed improvement. It was mid-August before crushing proceeded without undue hindrance, and with a regular cane supply the mills were able to demonstrate their capacity to handle the crop at a high rate. The aggregate crushing power of the State's mills reached a peak of over 301,000 tons per week in September and averaged 290,000 tons per week for a seven week period, indicating that under average harvesting conditions the estimated crop could have been handled in twenty-four weeks. Heavy rains set in again early in November and in a very short time the aggregate tonnage crushed had fallen to 127,000 tons in a week. The season dragged on until February, during which time farmers encountered the most deplorable harvesting conditions they could remember. Transport systems were entirely disorganized, portable tramline could not be used on the flooded fields and many thousands of tons of cane were removed on slides and re-loaded on headlands.

Such a season had a marked effect on the sugar content of the cane which at no time attained its normal peak of maturity and which at the end of the season dropped to uneconomic levels. The resultant cane to sugar ratio of 7.61 was the lowest since 1924 and is in striking contrast with the ratios of 6.73 to 6.94 enjoyed in the late thirties.

During this disastrous harvesting period the foundation of the 1951 crop was being laid, but, as would be expected, the conditions were hardly propitious for development. Early planted cane which had the opportunity to establish a root system prior to the onset of the heavy rains in July made good progress, but the late plantings suffered from the over-wet soils and were generally unthrifty. Ratoons also failed to grow normally and in many cases were failures. Those from the late cut crops failed to produce a harvestable tonnage for 1951. The far north and Mackay divisions were the worst affected, the crops in the Lower Burdekin and Bundaberg being reasonably favourable though much below those of 1950.

In the following table are shown the monthly rainfall for the several districts, together with the number of wet days in each instance. Two methods of recording wet days have been adopted—(1) those days when precipitations of more than 1 point were recorded and (2) those days when more than 20 points were recorded. The former is the meteorologists' definition of a wet day, whilst the latter has been included in an attempt to determine the periods when weather conditions may have influenced operations. It is realised, of course, that the direct influence of 20 points or more of rain will vary considerably, depending, *inter alia*, on the actual time of the day that the rain falls and the general weather over the immediate preceding days.

ESTIMATE OF THE 1951 CROP

As is customary an early estimate of the tonnage of cane which would be available for harvesting was made in May, 1951. The figures received revealed that an anticipated 5,855,168 tons of cane would be available and it was calculated that this would result in the manufacture of 802,000 tons of 94 n.t. sugar. This was a serious drop from the 6,691,706 tons of cane and 879,844 tons of sugar produced in 1950, the recession being caused mainly by unfavourable weather. The acreage estimated to be harvested is 250,000 compared with 257,562 acres cut for milling in the previous year. This estimate was written down in the official forecast to 5,600,000 tons of cane and 767,000 tons of sugar since it was felt that the dry conditions and the probability of a severe winter would reduce the figures appreciably.

TABLE I.—RAINFALLS IN CHIEF CENTRES OF PRODUCTION DURING PERIOD JULY, 1950, TO JUNE, 1951, INCLUSIVE.
(Showing Rainfall (in Points), Number of Wet Days and Number of Days on which 20, or More, Points were Recorded, Monthly, for each 6-Month Period and for the Whole 12-Month Period).

Centre	July		August		September		October		November		December		Period: 6 Months		January		February		March		April		May		June		Period: 6 Months		Period: 12 Months		Average Annual Rainfall									
	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain	Wet Days	Total Rain										
Mossman ..	491	21	9	22	6	0	114	11	1	303	14	4	2,109	15	8	3,211	20	16	904	13	9	977	12	8	141	4	2	190	15	3	154	7	3	4,337	77	43	10,587	180	81	9,364
Cairns ..	208	17	3	18	5	1	157	8	4	188	7	4	1,322	13	7	2,291	20	15	629	16	7	764	16	10	169	2	1	175	15	3	153	5	4	3,725	78	42	7,909	148	76	8,815
Babinda ..	1,328	14	11	274	6	4	882	7	6	351	7	5	1,654	11	9	4,079	18	17	1,783	14	11	1,112	12	7	144	1	1	551	11	9	527	6	5	6,579	63	52	15,147	126	106	16,487
Innisfail ..	1,844	22	17	476	12	4	741	9	7	227	5	3	2,385	10	8	4,134	21	20	1,496	15	11	1,419	15	12	376	4	3	743	16	13	627	6	6	6,450	80	63	16,257	159	122	14,359
Tully ..	2,109	17	16	424	10	6	904	8	7	592	10	7	2,767	12	11	4,996	20	15	2,103	14	10	1,758	11	9	158	2	2	1,270	14	11	844	5	4	8,404	68	50	20,196	145	112	18,172
Ingham ..	541	15	7	64	6	1	190	9	2	223	11	5	1,915	8	8	1,051	15	12	1,349	14	11	634	8	4	67	3	1	452	11	7	61	4	1	4,368	62	38	8,352	126	73	8,053
Giru ..	1,043	12	9	13	1	0	61	2	2	15	1	0	1,202	6	5	420	9	7	422	7	7	261	3	3	0	0	0	232	3	2	43	0	1	4,645	34	28	6,399	65	51	4,883
Ayr ..	1,239	16	9	0	0	0	11	2	0	19	4	0	661	9	5	258	12	3	481	9	7	179	6	2	56	3	1	199	4	1	43	2	1	4,393	50	30	6,581	93	47	4,278
Proserpine ..	1,402	20	12	24	3	0	36	3	0	263	6	3	1,299	12	6	788	13	10	610	13	6	329	8	4	94	2	2	230	5	2	215	4	3	5,637	51	32	9,499	108	63	7,135
Mackay ..	864	17	10	94	7	1	38	5	1	233	10	3	961	14	5	517	13	7	471	14	4	270	15	4	60	3	1	226	10	4	161	4	2	5,839	66	25	8,596	132	52	6,574
Sarina ..	1,280	16	10	91	6	2	43	6	0	1,071	10	6	808	10	5	633	12	7	640	10	4	399	9	7	0	0	0	255	4	3	167	5	2	8,463	44	26	12,289	104	56	6,890
Bundaberg ..	1,208	19	8	50	7	0	50	4	1	290	10	4	895	12	6	231	11	3	154	11	3	229	11	4	220	6	3	76	3	1	93	3	1	2,080	51	30	4,804	114	52	4,365
Childers ..	654	16	9	81	9	1	19	5	0	559	8	5	964	10	5	278	10	5	468	10	4	171	11	3	221	5	4	45	4	1	89	4	1	1,850	51	21	4,415	109	46	4,227
Maryborough ..	713	17	12	138	13	2	14	4	0	557	7	6	679	11	8	294	13	7	268	12	3	291	12	5	195	4	4	86	6	2	77	8	1	2,150	55	25	4,545	120	60	4,569
Nambour ..	1,464	17	15	261	11	4	70	5	4	526	13	7	933	13	7	603	11	8	759	10	8	900	20	6	38	5	0	241	7	2	142	6	2	5,063	64	31	8,920	154	76	6,488
Beenleigh ..	960	15	13	75	5	2	129	5	3	440	8	6	494	6	5	315	6	5	263	5	4	722	10	6	115	3	2	115	7	2	332	5	4	3,211	47	30	5,624	92	64	4,789

Wet Days: Columns "A"—Total Days on which Rainfalls were recorded. Columns "B"—Totals Days on which 20, or more, points of rain were recorded.

In the provisional 1951 estimates only one mill shows a crop in excess of 300,000 tons, six between 250,000 and 300,000 and ten between 200,000 and 250,000. In all areas the early cessation of the wet season cut down the normal growing period and the dry autumn months promoted higher than average sugar content in cane for the start of the season. At the time of writing—late July—severe frosts have caused serious damage in the southern districts and this occurrence must result in the loss of much cane and sugar. It is very doubtful whether earlier crop and sugar estimates will be realized and a production of 740,000 tons of 94 n.t. sugar would appear to be a reasonable expectation.

The three New South Wales mills are estimated to crush 384,000 tons of cane with a production of 48,000 tons of 94 n.t. sugar. Frost damage is certain to reduce this figure also.

In Table II below are shown the individual Queensland mill estimates for 1951 as well as the actual crushings for 1950.

TABLE II.
SUGAR CANE HARVESTED, 1950—ESTIMATED, 1951

Domestic Tonnage	Actual Tonnage		Mill	Estimated Crop, 1951
	Accepted	Condemned		
155,340	155,340	869	Mossman	140,000
225,475	225,424	89	Hambledon	234,000
282,927	282,662	0	Mulgrave	250,000
260,005	260,269	0	Babinda	227,772
210,306	210,358	608	Goondi	200,000
292,573	292,573	0	South Johnstone	264,000
195,575	195,575	557	Mourilyan	180,000
320,751	320,751	685	Tully	262,486
342,246	352,072	276	Victoria	290,000
337,204	327,378	54	Macknade	268,000
2,622,402	2,622,402	3,138	..	2,316,258
113,596	113,596	179	Invicta	90,000
238,159	238,159	87	Pioneer	267,440
253,758	253,758	70	Kalamia	241,000
277,827	277,827	106	Inkerman	339,000
883,340	883,340	442	..	937,440
238,066	238,126	384	Proserpine	180,000
110,758	110,752	100	Cattle Creek	94,770
250,309	250,307	412	Farleigh	215,000
263,302	263,393	438	Racecourse	236,700
137,884	137,825	189	North Eton	110,000
236,225	236,020	157	Marian	180,000
264,850	264,988	290*	Pleystowe	210,000
195,279	195,262	212	Plane Creek	179,000
1,696,673	1,696,673	2,182	..	1,405,470
123,684	123,563	0	Qunaba	80,000
269,810	261,989	369	Millaquin	200,000
269,394	264,963	50	Bingera	230,000
222,886	235,259	267	Fairymead	214,000
83,540	83,540	47	Gin Gin	75,000
252,231	251,969	112	Isis	215,000
83,770	85,922	18	Maryborough	55,000
42,161	40,271	25	Mt. Bauple	15,000†
124,029	124,029	0	Moreton	100,000
17,786	17,786	0	Rocky Point	12,000
1,489,291	1,489,291	888	..	1,196,000
6,691,706	6,691,706	6,650*	..	5,855,168

† To be crushed by other mills. * Includes 154 tons accepted but not crushed by Pleystowe Mill.

1950 CROP STATISTICS

The tonnage of cane crushed in the State's 32 sugar mills was an all time record. The final figure was 6,691,706 which was 173,664 tons in excess of the 1949 crop, itself a record. It had been estimated that seven million tons were in sight for 1950 crushing but the excessively wet harvesting season compelled the closing down of many mills through inadequate cane deliveries. A large tonnage was accordingly left to standover for the following season. The record tonnages handled at many mills involved crushing over extended periods. Fourteen mills crushed for 30 weeks or more while two of them carried on operations for 35.3 weeks. The first mill to commence crushing was Macknade on May 17th while North Eton was the last to finish on February 5th. Three other factories did not finalize operations until early in February. The long average season was not the result of mills being unable to handle the crop in a reasonable period but was caused by the excessively wet conditions in July when mills which had already started had to cease operations while others had their crushing delayed beyond the planned starting dates.

The tonnage of condemned cane delivered to the mills is shown in Table II. The figure of 6650 tons is extraordinarily high and is distributed uniformly throughout the major sugar divisions of the State. It is due to the delivery of immature cane (below 7.0 c.c.s.) in the early part of the season and to late season deliveries when heavy rainfall conditions promoted rapid growth. This figure has been deducted before calculating mill performance.

The tonnage of 94 net titre sugar produced during 1950 season totalled 879,844 tons, which figure includes 155 tons local sales. Despite a record tonnage of cane having been crushed the sugar produced was below that of both the 1948 and 1949 seasons by 30,205 and 17,423 tons respectively. It was also below the 1939 sugar production. A marked change in the cane/sugar ratio was responsible for this lowered output of sugar, the figure increasing to 7.61 as compared with 7.26 and 7.07 in the previous two years. It is 26 years since a quality ratio figure of 7.6 has been experienced in Queensland. Although there is an appreciable trend towards less favourable sugar content figures as the result of varietal changes the 1950 experience was caused in the main by very wet harvesting conditions and almost continuous cane growth.

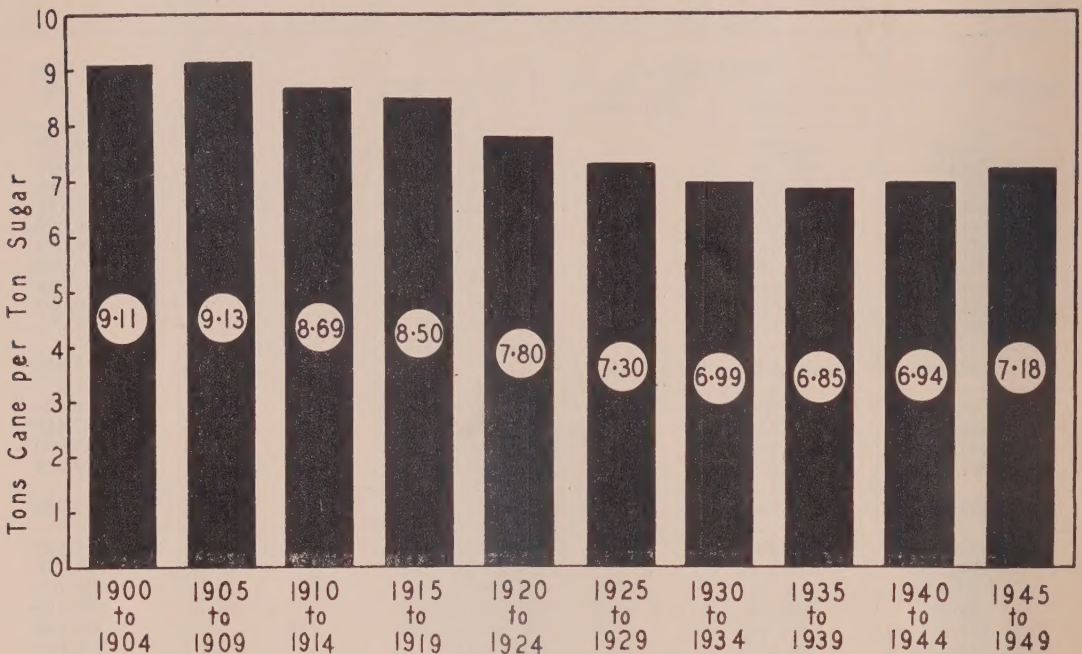


Fig. 1
Illustrating the cane/sugar ratios for five-year periods from 1900 to 1949.

The annual sugar production figures for the past six years are shown in Table III. These divide the State into the north and south of Townsville regions. It is shown that the tonnage of sugar produced remained practically unchanged in the northern sector last year and that the south carried the deficiency. The drop in production in the latter amounted to three per cent.

TABLE III.
SUGAR PRODUCTION (94 NET TITRE), 1945-1950.

	1945	1946	1947	1948	1949	1950
North of Townsville ..	282,034	233,732	255,958	356,969	345,684	344,944
South of Townsville ..	362,627	278,354	315,700	553,080	551,583	534,900
Totals	644,661	512,086	671,658	*910,049	*897,267	*879,844

* Includes Local Sales.

There was a drop of some six and a half per cent in the acreage harvested for milling. The figure amounted to 257,562 compared with 275,313 in the previous year. As pointed out above considerable areas were left standing owing to the wet conditions and this contributed in no small measure to the decreased acreage harvested. In contrast with the 1949 season there was an increase in the proportion of crop obtained from plant cane and a decrease in that harvested from ratoons. The percentage of standover acreage was practically unaltered. There is considerable scope for the growing of more ratoons in the industry and thus making more economic use of the assigned acreage available. In the aggregate the ratio of plant to ratoon cane was 1 : 1.36 instead of 1 : 2, which is the theoretical maximum under the assignment system. In the Lower Burdekin the 1950 figures disclose a ratio of 1 : 0.46; it is difficult to understand this position in view of the known high cost of producing plant cane only, and after considering the fact that very successful ratoon crops can be grown on Burdekin soils.

One explanation of the increased proportion of plant cane acreage harvested is the opening of new Soldier Settlement lands, much of which was harvested for the first time in 1950.

TABLE IIIA.

District	Plant Cane		Ratoons		Stand-over		Total Acres
	Acres	..	Acres	..	Acres	..	
Northern	36,652	34.9	68,243	65.1	29	.0	104,924
Burdekin	16,323	66.1	7,614	30.8	765	3.1	24,702
Mackay	38,040	52.0	34,899	47.7	201	.3	73,140
Southern	14,261	26.0	32,395	59.1	8,140	14.9	54,796
Whole State	105,276	40.9	143,151	55.6	9,135	3.5	257,562

The district figures for cane and sugar per acre are given in Table IV. With the exception of the Nambour-Beenleigh district figures for cane per acre are all up on 1949 and in the aggregate the production of 25.98 tons of cane per acre is an all time record. The sugar per acre figure of 3.42 tons exceeds all previous years except the record of 3.52 reached in 1948. Here again most individual districts showed marked increases, the best advance being in the Lower Burdekin where district production averaged 5.14 tons of 94 n.t. sugar per acre. The Bundaberg-Gin Gin area was second in sugar per acre production with 3.36 tons, while Mossman-Ingham filled third place.

TABLE IV.

TOTALS AND AVERAGE YIELDS BY DISTRICTS, 1950.

Districts	Tons of Cane	Tons Cane per Acre	Tons 94 N.T. Sugar per Acre
Mossman-Ingham	2,622,402	24.99	3.30
Lower Burdekin	883,340	35.76	5.14
Proserpine	238,066	21.99	3.07
Mackay	1,458,607	23.72	3.13
Bundaberg-Gin Gin	969,314	27.03	3.36
Childers-Maryborough ..	336,001	25.54	3.23
Nambour-Beenleigh	183,976	24.11	2.93
Whole State	6,691,706	25.98	3.42

The data in Table V. gives production statistics for the past ten years. The years 1948 to 1950 are shown as a period of record production and are in contrast to the lowered yields of the war years and of the drought affected 1946/1947 period.

TABLE V.

ACRES CULTIVATED AND HARVESTED, YIELDS OF CANE AND OF SUGAR, AND ACRE YIELDS AND QUALITY OF CANE, 1941-1950.

Year	*Acres Cultivated	Acres Harvested for Milling	Total Yields		Yields per Acre		Tons Cane per ton Sugar
			Cane	Sugar	Cane	Sugar	
1941	334,787	246,939	4,793,589	697,345	19.41	2.82	6.87
1942	316,798	238,213	4,350,642	605,680	18.26	2.54	7.18
1943	326,478	228,895	3,397,424	486,747	14.84	2.12	6.98
1944	317,386	222,215	4,398,190	643,540	19.79	2.90	6.83
1945	326,247	239,826	4,551,982	644,661	18.98	2.69	7.06
1946	317,766	228,395	3,714,475	512,086	16.26	2.24	7.25
1947	332,516	220,649	4,150,987	†571,658	18.81	2.59	7.26
1948	384,213	258,585	6,433,556	†910,049	24.88	3.52	7.07
1949	395,660	275,313	6,518,021	†897,267	23.67	3.26	7.26
1950	..	257,562	6,691,706	†879,844	25.98	3.42	7.61
Average 10 yrs.	..	241,659	4,900,057	684,888	20.28	2.83	7.15

† Includes Local Sales.

In the following molasses table the quantities are shown for the first time in tons rather than gallons. This alteration is made at the request of the industry and is probably of more value in mill records. There was a considerable drop in molasses production per ton of cane crushed and the changes in disposals are worthy of comment. The amount used for stock food remained static and that sold to distilleries decreased by 15,000 tons. Usage for fertilizer dropped by 13,000 tons but it is not known whether this was caused by wet field conditions making distribution difficult or by shortage of the product for fertilizer purposes. Of the total production only 19 per cent. was used as a soil amendment compared with 23 per cent. in 1949. It is irrefutable that the most beneficial method of disposal of molasses is by returning

it to the sugar producing soils. Its value as a fertilizer is beyond doubt, and with the very high price—and short supply—of potash it is in the best interests of both miller and grower to allocate the maximum quantities for this purpose.

TABLE VI.
DETAILS OF MOLASSES DISPOSALS FOR 10 YEARS, 1941-1950*

Usage	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
	Tons of Molasses:—									
Distilleries ..	84,113	68,089	47,894	59,516	61,307	69,842	54,014	119,615	115,376	99,940
Fertilizer ..	9,863	12,092	13,837	17,885	20,095	18,938	23,276	34,655	49,293	36,446
Stock Feed ..	22,793	20,001	19,923	30,742	30,559	45,288	34,808	38,349	36,479	36,621
Mill Fuel ..	8,046	19,691	14,194	14,668	11,426	6,238	9,340	11,003	9,771	15,556
*Ferment ..	..	..	..	..	..	..	..	2,479	3,561	3,582
Other Purposes ..	1,037	1,974	2,879	1,657	2,765	1,575	2,047	161	1,204	231
Wasted ..	361	203	637	109	333	415	99	1,099	1,858	325
Totals ..	126,213	122,050	99,364	124,577	126,485	142,296	123,584	207,361	217,542	192,701

*Prior to 1948, molasses used for cleaning ferment is included in that used for "Other Purposes."

SUGAR VALUES, 1950 SEASON

The Sugar Board has declared the final price for the 1950 season's sugar as follows:—

	No. 1 Pool			No. 2 Pool	Total
	Home Consumption	Surplus	Total	Excess	
Tons	484,538	383,126	867,664	12,025	879,689
Per cent.	55.844	44.156	100	..	..
Price	£24 11 0	£32 16 6	£28 4 1	£32 16 6	£28 5 4

In addition, the values for New South Wales production were:—

	Home Consumption	Surplus	Total
Tons	33,721	7,534	..
Per cent.	81.7375	18.2625	..
Price	£24 11 0	£32 16 6	£26 1 3

The Queensland sugar production, based on the above figures, was valued at approximately £24,866,000, being some £900,000 higher than the previous year. Although the tonnage of sugar produced was lower than in 1949 the increased price obtained resulted in a greater gross value. The overall price advanced by £1/10/6 per ton.

The following Table summarises production and consumption figures and sugar values for the past ten years. A table of mill peak allocations is also given below to indicate the years in which the various Mill Peak Schedules operated.

Year	Total Sugar Production at 94 n.t.	Tons Sugar Exported 94 n.t.	Average Australian Price	Average Export Price	Average Price No. 1 Pool Sugar	Average Price all Sugar	Total Value
			£ s. d.	£ s. d.	£ s. d.	£ s. d.	£
1941	696,927	281,275	22 13 0	10 18 9	18 0 4	18 0 2	12,550,500
1942	605,361	188,080	22 14 6	10 16 3	19 1 0	19 0 6	11,516,000
1943	486,354	75,650	22 10 6	13 2 6	21 1 3	21 1 3	10,244,000
1944	643,475	208,679	22 2 0	15 0 6	19 18 1	19 16 1	12,744,000
1945	644,624	205,453	21 18 0	16 17 9	20 8 2	20 6 1	13,087,000
1946	512,035	72,578	21 18 0	21 10 0	21 16 11	21 16 10	11,184,000
1947	571,503	95,246	24 0 0	29 12 6	24 16 0	24 18 9	14,251,000
1948	909,896	440,814	23 1 0	28 2 0	24 17 0	25 9 11	23,198,000
1949	896,236	431,254	24 6 0	29 7 6	26 9 3	26 14 10	23,967,000
1950	879,689	395,151	24 11 0	32 16 6	28 4 1	28 5 4	24,866,000

TABLE OF MILL PEAKS AND OF PROPOSED ULTIMATE PEAK BY 1953.

Mill	1929	1939	1949†	1950†	Proposed Ultimate 1953 Peak††
Mossman	14,972	20,000	22,000	22,000	27,000
Hambledon	31,836	36,000	39,600	39,600	44,000
Mulgrave	31,643	36,000	40,100	40,100	44,000
Babinda	31,901	36,000	39,600	39,600	45,000
Goondi	27,034	29,500	32,400	32,400	37,000
South Johnstone	30,979	36,000	39,600	39,600	47,000
Mourilyan	23,630	27,000	29,700	29,700	32,000
Tully	30,930	38,000	42,100	42,100	47,000
Macknade	30,952	34,000	39,900	46,500	49,000
Victoria	32,221	37,500	43,600	49,100	82,000
Invicta	11,736	16,000	18,300	19,100	27,000
Kalamia	26,053	31,000	35,400	35,600	40,000
Pioneer	21,391	26,000	30,100	34,000	36,100
Inkerman	*24,207	31,000	36,800	42,000	46,800
Proserpine	16,650	23,000	26,300	33,000	36,500
Farleigh	16,993	23,000	27,600	32,400	34,800
Racecourse	18,066	24,000	29,000	35,200	36,700
Pleystowe	19,781	24,000	29,200	35,900	37,900
Maian	18,997	24,000	28,600	32,300	34,400
North Eton	9,319	12,000	14,500	15,900	17,600
Cattle Creek	8,791	12,000	13,400	14,100	15,200
Plane Creek	18,233	24,000	28,600	30,800	34,100
Fairymead	15,882	21,000	25,700	28,600	30,200
Qunaba	8,940	10,000	11,200	12,700	13,700
Millaquin	14,443	19,000	24,100	29,600	31,800
Bingera	17,864	23,000	27,800	31,000	33,400
Gin Gin	6,000	6,500	8,000	8,400	11,000
Isis	28,011	27,000	30,000	30,200	31,600
Maryborough	3,862	7,500	9,500	9,500	12,000
Mount Bauple	6,231	6,500	7,200	7,200	8,000
Moreton	11,586	14,000	16,000	16,000	19,000
Eagleby	280	300	..	..	..
Rocky Point	2,014	2,200	2,700	2,700	3,200
	611,428	737,000	848,600	916,900	1,045,000

* Increased by 2,500 tons in 1938.

† Does not include 3 per cent. for Soldiers' Settlement.

†† Subject to provision for the following being realised:—

- (1) 3 per cent. for Soldier Settlement.
- (2) New settlement.
- (3) Improved settlement for smaller assignment holders.
- (4) Mill crushing capacity.

REVIEW OF THE INDUSTRY

Royal Commission

The work of the Royal Commission on the Sugar Industry (1950) continued during the year. Continuity was not practicable owing to the absence overseas of certain members, but announcements have been made in Government quarters that the report and recommendations of this Commission will be presented to the Government in the near future. Orderly planning of the industry over a period of twenty-five years is a major project and the finding of the Commission are awaited with interest.

International Sugar Agreement

The 1937 International Agreement has, since that time, been carried on by successive Protocols but during 1950 the major sugar exporting and importing countries demonstrated on the International Sugar Council a wish to convene a full scale Sugar Conference. The Council, therefore decided to hold a special meeting in December, 1950, but this was, at a late date, postponed to February, 1951. Later the proposed meeting was further postponed and no final decision to meet has yet been made. A new International Agreement is of importance to Australia since from 1953 onwards this country will have approximately 300,000 tons of export sugar not covered by negotiated price. An International Agreement may prevent world prices declining to non-remunerative levels and in this regard it could affect the price being received for the 300,000 tons for which a guaranteed, negotiated price is paid. Our industry does not desire a repetition of the disastrous price levels which operated in the 1930's and the surest way to avoid such a calamity is to provide for some stability in production and marketing per medium of a new agreement.

Sugar Agreement with United Kingdom

Negotiations relating to this Agreement were continued in 1950. The agreement reached in November, 1949, covered the quota provisions and gave to Australia an amount of 600,000 tons per annum, half of which would be at a guaranteed price negotiated from year to year; the remainder would be sold on Canadian and United Kingdom markets at world price plus preference. During 1950 the matter of differential prices to be paid by the Imperial Government to the Empire sugar exporting countries was the subject of considerable discussion. The British Ministry of Food sought to introduce the principle of differential prices whereas Australia strongly favoured the retention of price uniformity as between the various Dominions and Colonies.

An Australian delegation led by the Hon. the Premier of Queensland visited London in December, 1950, primarily to defend the principle of price uniformity in the negotiations. The Ministry of Food agreed that the 1951 price would be on a uniform basis and it was ultimately announced by the United Kingdom Government that the principle of price uniformity would be agreed to throughout the full term of the Agreement.

These negotiations resulted in an increase of £2/7/6 sterling per ton in the negotiated price. This made the basic export price for 1951 £32/17/6 sterling compared with £30/10/- for 1950. This price was conditional upon there being no alteration to freight arrangements or other conditions of the contract, which latter include the meeting by the Ministry of Food of all freight charges on our export sugar in excess of £1/15/6 sterling per ton.

Home Consumption Price

Following the price increase to £41/9/4 which was granted on home consumption sales on October 28th, 1949, the increased costs of production continued to rise steeply. Accordingly the industry prepared in February, 1951, a case for submission to the Federal Government but before finality could be reached the double dissolution of Parliament compelled postponement of its presentation until the first sittings of the new Parliament. Eventually, on June 25th, Federal Cabinet came to a decision on the industry's case and a new agreement was signed on June 27th. By July 6th the Bill to ratify the agreement had passed all stages in both Houses of the Commonwealth Parliament.

Under the terms of the agreement the wholesale price on home consumption sugar was increased from £41/9/4 to £53/6/8 per ton. With certain increased margins to both wholesalers and retailers, this resulted in the retail price of sugar being raised by 1½d. per lb. to 6d. per lb. in capital cities. At the same time the agreement provides for the suspension of the annual payment of £216,000, which is made by the sugar industry to the Fruit Industry Sugar Concession Committee, until such time as the Committee's funds fall below £500,000. This saving amounts to approximately 8/- per ton of home consumption sugar.

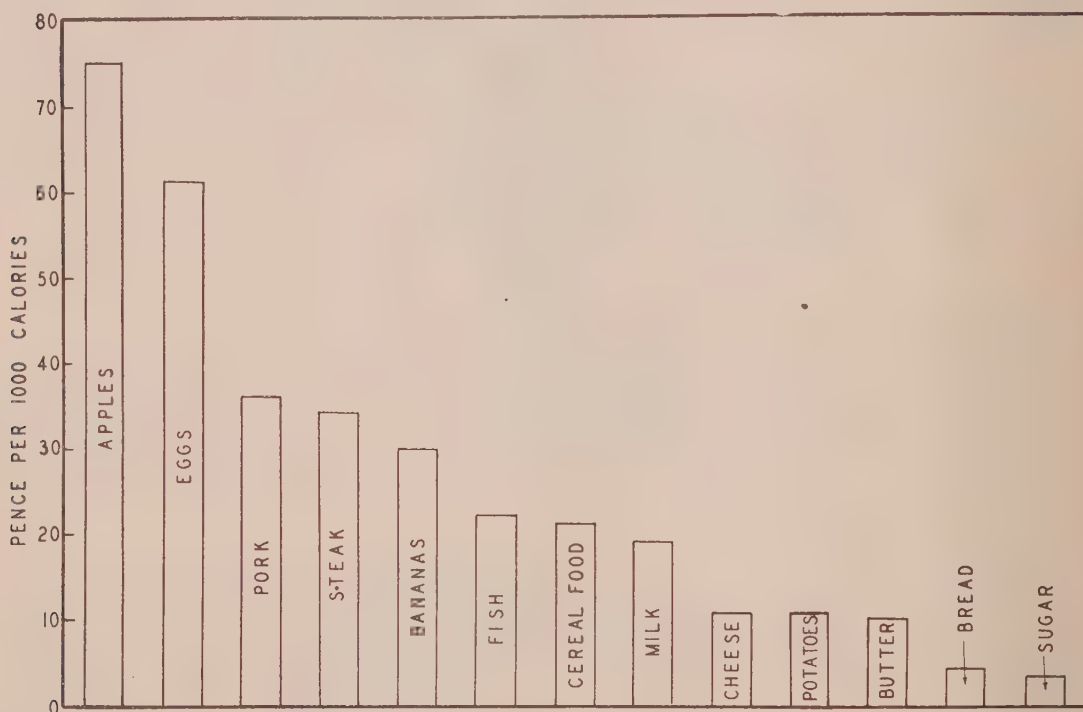


Fig. 2
Showing the cost of 1,000 calories in various foods. Based on average retail prices in Brisbane, October 2, 1951.

The Cuban Negotiations

A certain amount of disquiet was caused in the minds of Australian sugar industry leaders by the news that negotiations had been proceeding between both the United Kingdom and Canadian Governments and Cuba in regard to purchases of Cuban sugar by both those countries on a special basis. Although the proposed terms have not been disclosed it is apparent that Cuba regards the proposed arrangements as a concession since Cuba, in return, plans to cancel certain import preferences now benefiting U.S.A. The disturbing feature of these negotiations is that the Board of Trade was discussing details of such a purchase at the same time as the Ministry of Food was finalising with Commonwealth producers the Sugar Agreement with the United Kingdom; the Ministry of Food had emphasised at these talks that non-Empire sugar would enter the United Kingdom only under normal marketing arrangements. The latest information available indicates that no trade agreement has yet been signed between the United Kingdom and Cuba and that any such pact is likely to be dependent upon discussions being held in the West Indies by the Board of Trade and the Ministry of Food.

Following fast on the heels of the above-mentioned news came word that Canada had entered into an agreement with Cuba to take 75,000 short tons of Cuban sugar during the years 1951 to 1953 inclusive. The text of the Canadian statement disclosed that Canada was prepared to enter into similar arrangements with other non-preferential sugar producers to the extent of a maximum of 150,000 tons annually during the same period. This would amount to practically twenty-five per cent of Canada's total import requirements.

International Society of Sugar Cane Technologists

For the second time in fifteen years this body selected Queensland as the meeting place for its Congress. Fifty-six overseas delegates, among whom were some of the world's outstanding research workers in sugar cane technology, attended the conference in Brisbane and made a tour of the sugar districts of Queensland. Countries represented were Hawaii, United States of America, British West Indies, Cuba, Great Britain, South Africa, Mauritius, India, Java, Taiwan, Philippine Islands and Fiji. A two weeks tour from Brisbane to Mossman preceded the week of technical sessions at which 84 papers were read and discussed. The Government of Queensland made available a special train for the 2,000 mile tour and the delegates were afforded every opportunity to see in detail the agricultural, milling and technical sides of the industry at first hand. During the twelve years which had elapsed since the previous Congress in Louisiana, agricultural development in particular had made very marked progress and for that reason alone the 1950 Conference was an outstanding one. The opportunities for exchange of experience in the fields of cane breeding, entomology, pathology and agronomy were fully availed of and were of benefit not only to Queensland workers in these fields but also to the visiting scientists.

Fertilizer

For the first time since 1939 ample supplies of sulphate of ammonia were available, but, owing to abnormal rains which interfered with the cultivation of the sugar-cane crop, they were not fully availed of. There is a world-wide shortage of sulphur which is necessary in the manufacture of superphosphate. Queensland's supplies of this fertilizer are made at Pinkenba where pyrites of Queensland origin are burnt in place of sulphur. Therefore, providing the supply of phosphatic rock is maintained, no shortage need be feared. A new superphosphate manufacturing plant is in the course of erection at Cairns which should take care of any immediate expansion in demand as well as providing a supply where large quantities are used. The remainder of Australia, particularly the major wheat growing States, are not so fortunate, as they are still, in some cases, dependent upon supplies of sulphur from overseas, in addition to which the demand for superphosphate has increased.

The supply of blood and bone fertilizer shows no signs whatsoever of improvement, nor can the position be improved until greatly increased numbers of cattle are processed. Even then, owing to the disparity in prices between feeding meals and fertilizer, it is doubtful whether any major relief would be obtained. Adequate supplies of potash are available in Europe but at present there is the greatest difficulty in obtaining shipping facilities. Shortages of this material can be expected in the near future.

Since July, 1950, the price of sulphate of ammonia has been raised by £7/10/- per ton to £34/7/6. This fertilizer is still subsidized to the extent of £7/10/- per ton. Blood and bone has been raised by £4 to £12/10/-, and superphosphate by £3/7/9 to £13/2/9. The price of potash has not changed from £34/8/-.

Mechanical Harvesting

The work of the Mechanical Harvesting Committee advanced a step further during the year with the Kinnear machine. A front end loader was purchased for trial and adaptation and progress has been made in redesigning the harvester on improved lines. At the same time two new harvesters have been produced in the Mackay district, both of which incorporate features of simplicity in design and economy in material. The continued shortage of harvesting labour is supplying an impetus to canegrowers to investigate the practicability of machine harvesting on their farms, but outmoded conservatism is preventing the majority from displaying an active interest in this slowly growing farm practice. One can readily understand a reluctance to invest in a machine costing £1000 or more for an average sized farm, but a reliable harvester at, say, half that price should be an attractive proposition if it will handle all or most of the crop.

THE SUGAR EXPERIMENT STATIONS BOARD

During the year under review legislation having an important bearing on the administration of the Bureau of Sugar Experiment Stations was passed by Parliament. It received Royal assent on March 30th, 1951, and was proclaimed as at the date of coming into operation, which was July 1st, 1951. The Amending Act provided *inter alia* for the future administration of the Bureau by the Sugar Experiment Stations Board, the transfer of all existing assets and funds to the new Board, and the fixation of staff salaries by the Board. The legislation was the result of many approaches by industry organisations to the Government over a period of years to remove the Bureau from Public Service control which, it was claimed, had contributed to loss of senior staff.

The new Sugar Experiment Stations Board was constituted by the Amending Act to consist of:—

- “(1) The Minister who shall be *ex officio* a member and Chairman of the Board;
- (2) The Under Secretary who shall be *ex officio* a member and the Deputy Chairman of the Board;
- (3) A member representative of the growers of sugar cane who shall be a nominee of the Queensland Cane Growers' Council; and
- (4) A member representative of the manufacturers of cane sugar who shall be a nominee of the Australian Sugar Producers' Association Ltd.”

The Board at present consists of:—

The Hon. H. H. Collins, M.L.A., Minister for Agriculture and Stock;
 Mr. A. F. Bell, Under Secretary for Agriculture and Stock;
 Mr. W. L. Poustie, Member of the Queensland Cane Growers' Council;
 Mr. J. W. Inverarity, Manager, Kalamia Estate.

The new Board will meet under the Chairmanship of the Minister from time to time and will decide matters of Bureau policy as well as considering all items of major importance in connection with administration and operation. The previously existing Advisory Board has been abolished by the Amending Act after 18 years of active association with Bureau affairs. It is the opinion of industry representatives that the new control will be of benefit to both growing and milling sides of the industry and that more flexibility will be possible in both staff matters and operations.

WORK OF THE BUREAU

Staff losses during the year included one analyst and two typistes, while new appointments added to the staff one Asst. Entomologist, two Field Assistants, three typistes and one librarian. The Asst. Entomologist, Mr. B. Hitchcock, was appointed to Meringa to assist in benzene hexachloride investigations and to initiate studies on insect vectors which may be responsible for chlorotic streak transmission. The two Field Assistants, Messrs. Toohey and Rehbein, were located at Mackay and Bundaberg respectively. The overseas scholarship holder, Mr. J. C. Skinner, began his genetics studies at Manchester during the year and will continue at that University for the two year period of the course.

During the year a Bureau expedition to New Guinea was planned for the purpose of collecting a number of both noble and wild cane varieties for breeding work. The writer made a short visit to the Territory in October, 1950, to discuss arrangements with the Administration and plans were made for an expedition in April, 1951. During that month Messrs. J. H. Buzacott and C. G. Hughes proceeded to New Guinea and spent two months in a search which was confined principally to the highland areas which had not previously been visited by sugar cane expeditions. Certain lowland districts were also examined and in all 165 varieties were forwarded to Brisbane. The relative proximity of New Guinea and the adjacent islands to Queensland render periodic visits by Bureau staff both practicable and desirable, and the 1951 visit should be followed by others to New Britain, Bougainville and other areas so far not exploited by cane collectors. From past experience it may be confidently claimed that there is more than a possibility of obtaining valuable commercial canes from New Guinea and the neighbouring islands, and there is a strong probability that breeding material collected will enhance the production of valuable varieties. The gradual encroachment of civilization into these natural habitats of the noble canes will result in many of them being lost to the cane breeding world. It is noticeable that when native populations are afforded the facilities for purchasing manufactured sugar they cease planting chewing canes in their gardens. It is important that sugar cane breeding organizations should collect as many as possible of these indigenous types before a changing economy causes their disappearance.

The considerable number of varietal trials harvested during the year did not disclose any outstanding new cane for the industry although Q.56 was added to the list of “Q” varieties and will be used as an alternative to Q.50 in the Mackay district. The annual series of varietal trials is essential to assess the potentialities of new seedling productions and each year a closer approach is made to the ideal commercial types. Certain of the “G” and “H” seedlings in the far north appear at this juncture almost certain to become canes of some prominence.

It is interesting to note that in a crop of some 6,700,000 tons three varieties, Trojan, Q.50 and Badila, aggregated 3,500,000 tons, while C.P. 29/116 accounted for a further 916,000 tons. Such increases on the part of the favoured few naturally coincide with the recession or disappearance of many of the old favourites. The rapid drop in the harvested tonnage of Q.28 is a matter of moment in varietal statistics. It was not until 1944 that this variety assumed any importance in district crushings, but in that year the imposing total of 111,000 tons was treated. By 1948 this figure reached 907,000 and by 1950 it had receded to 297,000. This is an outstanding example of the waxing and waning of a cane variety but in this case the two contributing factors of ratoon stunting disease and the development of the superior Q.50 were responsible for the rapid change in status of Q.28. Almost annually we witness the disappearance of a variety which at one time had a favoured place in some district. This year Oramboo does not figure on the approved list for any mill area in the State. It was



Fig. 3

The result of applying 55 lb. of copper sulphate per acre on land at Mt. Pelion near Mackay. Cane on left treated; on right untreated. The application was made on the plant cane and the crop is now second ratoons.



Fig. 4

A crop of *Stylosanthes gracilis* on Mackay Sugar Experiment Station. This is portion of a long fallow experiment to study rotation of cane with other crops.

one of a bracket of three canés—the others were Korpi and Nanemo—which were the only ones of the 1914 New Guinea expedition to attain commercial status; with its disappearance Badila is the sole remaining New Guinea variety now commercially grown.

The Bureau's work on green manure crops has resulted in an extremely heavy demand for seed of Reeves' Selection and Cristaudo cowpeas and of velvet bean. The performance of these three types is such as to ensure that they will satisfy the requirements of growers in all districts. Velvet bean appears to thrive and produce a good crop under even the harshest soil conditions, while the cowpea varieties will make a short fallow crop and will resist wilt. The Dept. of Agriculture is proceeding with a plan to produce certified seed of Reeves' Selection. The steep rise in sulphate of ammonia costs will be a further heavy burden on the industry, but much of the increased expenditure could be evaded if growers would standardize on growing green manures in the fallow period. No nitrogenous fertilizer would then be needed on plant cane.

The weedicide investigations proceeded at an increased tempo during the year and the work was extended in the field of farm demonstrations. The value of this latter policy was soon made evident by the increasing number of growers purchasing or making boom sprays. The cost of hormone weedicides is now such that the control of weeds by this means is definitely economical even if adequate field labour were available for cultivation purposes. The added advantage of being able to control weed and grass growth during the wet season when cultivation is impracticable is widely appreciated. The importance of timing in weedicide work and the need for care in obtaining complete soil coverage are such that some failures are inevitable where accuracy is sacrificed to speed. Considerable advance has been made with the general purpose contact weedicide which is required to clean up fields where germination of grasses has already taken place. At the same time work is proceeding on the use of trichloracetate on such resistant crops as guinea grass.

It is unfortunate that with a trend towards potash depletion in sugar growing soils there should have developed this year a shortage of potassic fertilizers owing to shipping difficulties. There is some cause for concern in the fact that growers who are advised of the need for potash in their soils persist in purchasing low potash mixtures because of their lower cost. At a time when the margin between cost of production of cane and its selling price is tending to shrink the use of incorrect fertilizer mixtures only reduces the net return per acre. It is a damaging form of false economy which cannot be too emphatically condemned. In the absence of adequate supplies of potash this year greater use should be made of the molasses output of the mills for fertilizing purposes.

In the field of pest control benzene hexachloride afforded further evidence, if such were needed, of its value in controlling the white grub. Some 37,000 acres were treated and were fully protected. On the other hand 22,500 acres which became grub affected, and which were not previously dressed with benzene hexachloride, suffered losses calculated at 95,000 tons of cane.

Advances in knowledge made during the year included confirmation of the belief that single applications of B.H.C. on the plant cane were equally as efficacious in protecting all three crops as were split dressings applied to both plant and ratoons. It was also confirmed that the higher concentration dusts gave effective control. Both of these results ensured greater economy to the cane growers without the sacrifice of any efficiency. Success was also achieved with third stage frenchi control by working out the correct placement technique. The quantity of B.H.C. used is identical with that used for greyback grubs and the placement is such that the latter are controlled if both species happen to be present.

Trials were made with a miscellany of newer insecticides against both species of grub and the results are discussed elsewhere in this report. Certain of these are effective in protecting plant cane, but the residual effect has still to be measured. Although it is not beyond conception that an equally satisfactory insecticide of another type may be evolved, the standards set by B.H.C. in low cost, ease of application, residual value and non-toxic effects on soils will be difficult to surpass.

An interesting sidelight on B.H.C. applications was discovered as the result of growers mixing the insecticide with fertilizer in an attempt to reduce costs of application by doing two jobs at once. Investigations showed that the uptake of fertilizer was partially or wholly prevented and that on soils where a fertilizer response would normally take place the crops were unable to utilize the plant food. This is a matter of considerable importance and illustrates the danger of departing in any way from the recommended and proved methods.

The vigilance of Disease Control Board officers in the Bundaberg and Moreton areas continues to pay dividends and it may be claimed with confidence that the conquest of Fiji disease is in sight and that the long and arduous struggle for control is nearing its end. In the six years since 1944-45 the number of diseased stools found in the Moreton district has shrunk from 10,000 to 189, while in Bundaberg the same period has witnessed a decrease from 7475 to 141. For the first year on record no downy mildew disease was located in any sugar area, nor was gumming disease known to exist throughout the sugar belt. Bureau pathologists look forward to the same happy position in regard to Fiji disease. No other sugar cane growing country in the world has been faced with the problem of eradicating three such serious diseases, and their complete control in this State will be an outstanding example of the application of scientific method in studying transmission methods and ultimately applying the knowledge in control measures. Not the least valuable factor is the excellent legislative power existing in our statutes.

In the section of this report dealing with pathology some space is devoted to pineapple disease. The increasing area affected by this bugbear of germination gives cause for concern. It is possible that one of the contributing factors is that greater risks are being taken by the growers than heretofore. Pineapple disease is more to be feared in the cooler months of the year when it was previously very unusual for planting to be carried out. In recent times the reliance on modern hardy varieties has extended the planting period into the winter months and improved the chances of disease attack. Mercurial dipping is undoubtedly a protective measure—and a sure one—but if growers do not desire to adopt this procedure they should plant only when conditions are warm enough to ensure a rapid strike.

The ratoon stunting disease in the central areas has been vigorously tackled by Bureau pathologists. Although the nature of the causal organism remains obscure considerable advances have been made in our knowledge of the affection. The resistance and susceptibility of a wide range of varieties is being gradually ascertained by resistance trials and such information can be applied both commercially in assessing the desirability of new varieties and technically in breeding from resistant parents. The Mackay canegrowers' preference for the relatively resistant Q.50 over the susceptible Q.28 has been a fortunate circumstance in controlling the disease and this has been assisted by the legislative measures taken to prevent the use of diseased planting material. The latter measures are more than justified because, despite its eclipse by Q.50, Q.28 is still a very valuable variety if maintained in a clean condition.

With the elimination of our major diseases in sight a full scale campaign to control chlorotic streak becomes the major item on the pathology programme. The considerable cane tonnage losses occasioned by this disease justify concerted action by Bureau pathologists and Cane Pest and Disease Control Boards in an endeavour to rid affected districts of its menace. The wet areas of the far north are the worst affected and it is there that the greatest concentration of effort will be required. The initial work must include studies by entomologists on the method of transmission of the disease as an insect may be responsible as in the case of Fiji disease. Studies made over recent years have disclosed serious losses in crop as a result of chlorotic streak and any advance made in its control will be a direct contribution towards improved district economy.

PUBLICATIONS BY BUREAU STAFF

Officers of the Bureau staff made the following contributions to technical sugar literature during the year:—

To the Proceedings of the International Society of Sugar Cane Technologists—

Buzacott, J. H.—Recent trends in the Production of Cane Seedlings in Queensland, by the Bureau of Sugar Experiment Stations.

Hughes, C. G.—The Control of Cane Diseases in Queensland.

King, Norman J.—Varietal Deterioration in Queensland.

Mungomery, R. W.—The Status of Benzene Hexachloride in the Control of Some Queensland Sugar-cane Pests.

Steindl, D. R. L.—Ratoon Stunting Disease.

Vallance, L. G., & Leverington, K. C.—The Effect of Molasses and Sweet Sorghum Residues on Soil Structure.

Venton, C. B.—The Present Status of Low Grade Work in Queensland.

Wilson, G.—Frenchi Grub Control in North Queensland by Benzene Hexachloride.

To the Proceedings of the Queensland Society of Sugar Cane Technologists—

Adkins, B. G.—Notes on the Viscosity of Molasses and Masecutes.

Bieske, G. C.—Rate of Decomposition of Organic Residue on Bundaberg Volcanic Loam.

Clayton, J. L.—Bulk Storage of Sugar at the Factory.

Vallance, L. G.—Pre-emergence and Post-emergence Control of Weeds by Chemical Sprays.

Venton, C. B.—The Application of the Douwes-Dekker Formula to Queensland Molasses.

Yore, K. J.—Investigations into the Unburnt Bagasse Nuisance.

The Sugar Industry, by Norman J. King. (Handbook of Queensland, Aust. Assn. for the Advancement of Science).

Recent Advances in Sugar Cane Culture in Queensland, by L. G. Vallance (Empire Journal of Experimental Agriculture).

In addition, the following publications were issued by the Bureau:—

Technical Communication, 1949, No. 4—Control of the "Greyback" Cane Grub Pest *Dermolepida albohirtum* Waterh., by means of "Gammexane" (Benzene Hexachloride), by R. W. Mungomery.

Technical Communication, 1951, No. 1—Report on Investigations in the Treatment of Final Masseccutes, by C. B. Venton.

Fifty Years of Scientific Progress.

Four issues of the Quarterly Bulletin and one issue of the News Letter were published. Four numbers of the Operations Report, a new publication, were circulated. This is designed to advise mills and other interested persons at an early date of the results of seasonal investigations in factories, and to eliminate as far as practicable the delays occasioned by having results printed. The four numbers issued in 1951 were:—

Clarification Tests with Bentonite.

Experiments with Magnesium Oxide as a Clarifying Agent.

Investigations into the Unburnt Bagasse Nuisance and Observations on Boiler Furnace Operation.

Sugar Deterioration.

APPENDICES

The Bureau levy for the 1950 season was twopence per ton of cane being one penny per ton payable by the grower and an equal amount by the miller. Receipts and disbursements for the year under review and totals since the inception of the Sugar Fund in 1900 are shown in Appendix I, whilst for the benefit of readers outside the Queensland Sugar Industry the derivation of the C.C.S. formula is given in Appendix II. As a result of the amending legislation mentioned previously in this report the Sugar Fund was closed on June 30th, 1951, and the balance transferred to the funds of The Sugar Experiment Stations Board.

APPENDIX I.

"The Sugar Experiment Stations Acts, 1900 to 1951."

SUGAR FUND.

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM 1ST JULY, 1950, TO 30TH JUNE, 1951.

RECEIPTS.				DISBURSEMENTS.			
		£	s. d.			£	s. d.
To Balance 1-7-50	.. .. .	36,314	7 5	By Salaries	.. .. .	28,324	7 1
„ Assessments	.. .. .	55,443	14 0	„ Contingencies	.. .. .	18,012	9 6
„ Endowment	.. .. .	7,000	0 0	„ Bundaberg	.. .. .	3,447	17 8
„ Bundaberg	.. .. .	2,517	12 6	„ Mackay	.. .. .	4,481	5 3
„ Mackay	.. .. .	1,981	19 6	„ Meringa	.. .. .	5,072	5 6
„ Meringa	.. .. .	1,562	14 5	„ Lower Burdekin (Brandon)	.. .. .	4,656	9 4
„ Sundries	.. .. .	738	16 7				
						63,994	14 4
				„ Balance, 30-6-51	.. .. .	41,564	10 1
		<u>£105,559</u>	<u>4 5</u>			<u>£105,559</u>	<u>4 5</u>

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM INCEPTION OF FUND, 1ST DECEMBER, 1900, TO 30TH JUNE, 1951.

RECEIPTS.				DISBURSEMENTS.			
		£	s. d.			£	s. d.
To Assessments	.. .. .	535,821	15 3	By Disbursements	.. .. .	871,784	0 10
„ Endowment	.. .. .	281,862	3 0	„ Balance	.. .. .	41,564	10 1
„ Sugar Experiment Stations	.. .. .	95,664	12 8				
		<u>£913,348</u>	<u>10 11</u>			<u>£913,348</u>	<u>10 11</u>

APPENDIX II.

C.C.S. FORMULA.

$$\text{C.C.S. in cane} = \text{Pol in cane} - \frac{\text{Soluble impurities in cane}}{2}$$

In practice, per cent. C.C.S. is calculated by the empirical formula—

$$\text{C.C.S.} = \frac{3P}{2} \left(1 - \frac{5 + F}{100} \right) - \frac{B}{2} \left(1 - \frac{3 + F}{100} \right)$$

where—

P = pol in first expressed juice.

B = brix in first expressed juice.

F = fibre in cane.

Division of Soils and Agriculture

Soil Technology and Experiment Stations Report

(By L. G. VALLANCE, Assistant Director)

ANALYTICAL WORK

The following is a summary of the analytical work performed at the Brisbane Laboratory for the period 1st July, 1950, to 30th June, 1951:—

Soils						No. of Samples
Farmers' samples	..	..	..	..	..	494
Fertility surveys	..	..	..	..	..	52
Experimental plots	..	..	..	..	..	248
Miscellaneous						
Waters	..	..	..	..	..	12
Mill by-products	..	..	..	..	..	8
Cane leaves	..	..	..	..	..	6
Other samples	..	..	..	..	..	8
Total	..	..	..	..	..	828

SOIL INVESTIGATIONS

Laboratory Work

Some 546 soil samples from farm properties were analysed during the year and fertilizer recommendations were forwarded to the growers concerned. In addition 248 soils were tested from experimental plots relating to soil aggregation studies and fertilizer trials. A further 34 samples representing irrigation waters, cane leaves, etc., were also analysed.

The following table shows the soil fertility trend in various cane areas as assessed from the phosphate and potash contents of the samples analysed. Seventy per cent. of the samples contained only fair or less amounts of available potash, thus indicating the importance of maintaining an adequate supply to the industry of this essential fertilizer. On the year's figures, which might be taken as reasonably representative of many districts, it would appear that phosphate deficiency is less pronounced than that of potash. Such a trend was previously observed and commented upon in the Annual Reports for 1949 and 1950.

SOIL FERTILITY TREND IN VARIOUS CANE AREAS SHOWING PERCENTAGE OF SOIL SAMPLES AT EACH FERTILITY LEVEL.

District	Phosphate			Potash			No. of Samples
	Low	Fair	Good	Low	Fair	Good	
Babinda-Mossman	% 10	% 3	% 87	% 28	% 25	% 47	60
Innisfail	34	5	61	58	18	24	146
Ayr	0	0	100	15	15	70	27
Mackay	11	46	43	32	57	11	28
Bundaberg	30	23	47	47	22	31	206
Southern	21	4	75	60	24	16	70
Total	26	13	61	47	23	30	537

Fertilizer Trials

Seven fertilizer trials, embracing both plant and ratoon crops, were successfully completed during the year. These were situated in the Mossman, Moresby, Proserpine, Isis and Maroochy districts and covered a wide range of soil types. The results indicated the necessity for using complete fertilizers. The universal response to sulphate of ammonia again revealed the marked nitrogen deficiency of Queensland sugar cane soils. It is essential that adequate supplies of this fertilizer must be made available to the industry annually if production is to be maintained.

In order to investigate the possibility of using finely ground raw rock phosphate to replace superphosphate a series of trials were put down in the Babinda-Tully area. These experiments were considered to be of some importance in view of the probability of the curtailment of sulphur imports. It was thought that rock phosphate might become available to the cane plant if applied as fertilizer on the more highly acid soils which occur under the very wet conditions of the abovementioned districts. Although only one of the plant crop harvests of the several trials gave definite results the figures obtained from this particular trial indicated that finely

ground rock phosphate applied at planting is not a satisfactory substitute for superphosphate in supplying phosphate to the plant crop. Whether the former material will become sufficiently available to supply the requirements of the ratoon crops remains to be seen, and the ratoons of these trials will be watched with a great deal of interest. Another series has already been set out to further observe the suitability of rock phosphate for plant cane.

Routine observations for the detection of minor element deficiencies were continued but with the exception of the two copper deficient areas previously recorded (Maroochy and Mt. Pelion, Mackay) no further nutritional defects were reported. A pot trial to define more closely the exact nature of the Maroochy occurrence is in progress at Nambour. In the Mt. Pelion area the spectacular recovery of cane to which about 56 lb. of copper sulphate was applied in the plant crop has persisted into the second ratoons. Excellent cane is now being grown where harvestable crops could not be previously established and growers in the affected areas are using fertilizer in which copper is incorporated as a routine practice.

Study of Rate of Decomposition

Since the rate of decomposition of organic matter is important under normal farming conditions laboratory studies were made on the behaviour of such materials as Poona pea, molasses, cane trash, bagasse and filter mud when intimately mixed with soil. It was found that the rate of decomposition of molasses and Poona pea was much more rapid in the initial stages than that of the other materials. Approximately 200 days after turning the various types of organic matter into the soil the decomposition was:—molasses 82 per cent., Poona pea 77 per cent., bagasse 68 per cent., trash 63 per cent. and filter mud 58 per cent. The soil used in this experiment was the Bundaberg red volcanic loam. The work has been extended to include other major soil types.

Studies on Soil Physical Condition

The 5 x 5 Latin square soil improvement trial conducted at Moggill and mentioned in last year's report was completed. The analytical data obtained during the regular sampling of the plots throughout a period of 380 days indicated that both the sorghum and molasses applications markedly increased the crumb structure of this clay loam soil. The most effective treatment was the 35 ton per acre sorghum dressing which quickly increased the amount of water stable aggregates from approximately 6 to 40 per cent. This occurred within 160 days of application, after which a gradual decline took place to 20 per cent. aggregation at the termination of the trial. The other treatments, which were 13.5 tons of sorghum and 12 and 3 tons of molasses per acre were less effective. Nevertheless, each of these was responsible for maintaining an appreciably better physical condition of the soil throughout the twelve months than was present prior to the various applications. A most interesting feature of this experiment was the steady increase that occurred in the aggregation of the non-treated check plots. This was probably due to the year's fallow and the growth of grass and weeds which developed throughout the trial.

WEEDICIDES

The use of 2,4-D for pre-emergence weed control has passed from the experimental stage to demonstrational work. A considerable number of demonstration plots were therefore set out on farmers' properties in all areas and excellent results were obtained. Many growers are now showing great interest in this method of controlling weeds and a number of home-made power sprays driven by tractors are in operation. Firms supplying 2,4-D have realised the possibility of an extensive market and are now marketing this material at prices which renders chemical control economically attractive providing suitable spray equipment is available. The high price of this latter item has a definite retarding effect on the more universal adoption of the method.

During the year further investigations were made into the question of obtaining a suitable contact or post-emergence spray. A solution containing 70-80 per cent. creosote or mineral oil has been found to be generally satisfactory, if used in the young stages of weed or grass growth. This spray also contains pentachlorophenol, the concentration varying from 3 to approximately 12 per cent. and the results indicate that the higher amounts are usually more effective. In addition this post-emergence spray contains 3 to 5 per cent. of 2,4-D. For most purposes this mixture is used at the rate of 4 gallons per acre with satisfactory results and without damage to the cane plant. Higher rates will readily cause serious damage to young cane. When a pre-emergence effect is required in addition to contact killing a further amount of 2,4-D is added to the solution to bring the amount of this ingredient up to the necessary 4 lb. per acre.

Sodium trichloracetate has been found to give a good control of guinea grass when applied at the rate of 100 lb. per acre. Such an application is somewhat expensive and further trials are in progress to determine whether smaller amounts can be effectively used.

NORTHERN SUGAR EXPERIMENT STATION

G. BATES, Senior Adviser, Officer in Charge

METEOROLOGICAL AND CROP GROWTH REPORT

Weather conditions during the latter portion of 1950 were abnormal. Good rain fell in October and this was followed by 13.35 inches in November and 18.39 inches in December, giving a total of 31.74 inches for the two months, which constitutes a record for this period of the year, the average for the past 27 years being only 9 inches. January falls totalled 20.39 inches which was also above average. This wet early summer was followed by abnormally small "wet season" rains, and the rainfall for the late summer months which usually yield heavy rains and floods was much below average. The usual flooding of rivers was conspicuous by its absence. The heavy early summer rain interfered seriously with the harvesting of the 1950 crop and was also fatal to the ratooning of many fields, cultivation being impossible for at least three months. Cane which was planted early and ratoons which were cut early grew well, but the late cane produced either poor crops or completely failed. Consequently, estimates for the 1951 crop show reduced average tonnages. The cessation of the rain at the end of January allowed growers to prepare land for autumn planting in 1951 and the acreage planted early must be a record.

The following tables show the rainfall records taken at the Northern Sugar Experiment Station over the past 27 years together with an abstract of other Meteorological Observations.

Year	Rainfall in Inches		Year	Rainfall in Inches	
1924-25	..	82.86	1938-39	..	126.79
1925-26	..	49.02	1939-40	..	82.10
1926-27	..	80.34	1940-41	..	80.59
1927-28	..	72.46	1941-42	..	41.55
1928-29	..	92.83	1942-43	..	64.60
1929-30	..	69.99	1943-44	..	52.92
1930-31	..	75.62	1944-45	..	120.34
1931-32	..	61.87	1945-46	..	63.95
1932-33	..	90.02	1946-47	..	35.24
1933-34	..	119.09	1947-48	..	69.12
1934-35	..	58.22	1948-49	..	85.77
1935-36	..	87.64	1949-50	..	83.50
1936-37	..	49.54	1950-51	..	67.68
1937-38	..	53.28			

Average for 27 years = 74.7 inches.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT NORTHERN SUGAR EXPERIMENT STATION, GORDONVALE, FROM 1ST JULY, 1950, TO 30TH JUNE, 1951.

Month	Rainfall in inches	No. of Wet Days	Shade Temperature						Mean Diurnal Range	Mean Temperature 9 a.m.	Mean Per Cent. Relative Humidity 9 a.m. .
			Maximum			Minimum					
			High	Low	Mean	High	Low	Mean			
1950											
July	1.75	11	89.0	72.5	80.31	70.0	58.0	65.06	15.25	71.5	85
August	0.04	1	88.0	73.0	80.60	67.0	48.0	58.20	22.40	70.03	75
September	1.01	8	88.0	77.0	84.00	70.0	56.0	61.80	22.20	74.10	76
October	2.61	4	92.0	81.0	88.90	77.0	57.0	66.80	22.10	79.00	70
November	13.35	15	98.0	80.0	89.90	74.0	57.0	68.10	20.80	81.00	70
December	18.39	20	92.5	79.0	88.60	76.0	62.0	67.90	20.70	79.46	78
1951											
January	20.39	28	99.0	85.0	90.10	75.0	67.0	70.90	19.20	81.70	83
February	3.67	15	97.0	84.0	90.70	72.0	60.0	67.50	23.20	81.10	78
March	4.04	14	96.0	84.0	89.50	70.0	60.0	66.30	23.20	79.40	82
April	0.90	3	94.0	84.5	86.40	69.0	55.0	66.50	19.90	76.80	82
May	0.72	13	91.0	81.0	84.50	67.0	52.0	59.40	25.10	73.40	90
June	0.81	6	87.0	74.0	82.70	67.0	41.0	53.50	29.20	68.90	80

Greyback grub infestation is extensive in the 1951 crop in all mill areas from Mossman to Tully on fields not protected by benzene hexachloride applications. The natural increase of beetle population since 1948 has been so great that infestation has extended into farms that have not previously recorded grub damage during recent years. Losses from grub damage would have been devastating in severity and extent if B.H.C. had not been available. However, where the application of B.H.C. was delayed or prevented on some fields by the heavy rains that fell from November till January, heavy damage occurred. In some cases makeshift methods of application were used which did not give satisfactory grub control.

Frenchi grubs, which have not been of importance in the Mulgrave area for some years, increased to the point of causing noticeable to severe damage on a few farms at Meringa and Aloomba and there was some frenchi damage at Mt. Sophia. The most severe effect on young cane was in fields that had been ploughed out and replanted. Frenchi were also active in sections of the Hambleton and Mossman areas. All cane on the Northern Sugar Experiment Station was treated with B.H.C., and as a result no grub damage occurred.

WORK OF THE STATION

Field Day was held at Meringa on 15th May under ideal weather conditions and was well attended by 320 growers and other persons connected with the sugar industry. Visitors were conducted on a tour of the Station in groups, with Bureau staff acting as guides. An excellent display of tractors, together with spray apparatus also caused considerable interest.

Plant Breeding Work

Fuzz was planted in the glasshouse during the last week of July and subsequently 8,582 original seedlings were planted in Division C.1 during the last week in October and first week in November.

Seedling selection in the 1950 crop was carried out and resulted in the selection of 148 seedlings which were planted in 40-sett plots. From the 40-sett plots of the previous year, 26 varieties were selected for planting in a yield-observation trial on Division A.4 using Trojan as a standard for comparison purposes. From the first ratoon yield-observation trial of "H" seedlings on Division A.6, five varieties were planted in a randomised block on Division A.2 with Trojan as a standard.

Arrowing

Following the abnormally light wet season in 1951 arrowing was sparse and late, particularly with noble canes. Full details of the cross pollination and relevant work appear in the report on Cane Breeding.

Jute

Experimental plots of Jute were planted at this Station in December, 1950, on red schist soil. Varieties tested were *Corchorus olitorius* and *Corchorus capsularis*. Planting of seed took place on December 27th following rain, when the land was in good tilth. Germination took place within three days, and *C. capsularis* at 10 lb. of seed per acre came up thickly and had subsequently to be thinned out. *C. olitorius* being old seed, was sown at 30 lb. per acre, and gave patchy germination. Early growth of both varieties was rapid, *C. capsularis* being most vigorous; the latter flowered in February, 1951, whilst *C. olitorius* was somewhat earlier.

The plots were harvested in mid-March, 10 weeks after planting. *C. capsularis* was far ahead of the other variety, attaining an average height of 80 inches and yielding approximately 13.9 tons of green matter. *C. olitorius* grew to 64 inches and yielded 7.9 tons per acre. It is of interest to note that *Rhyparida* beetles attacked this latter variety, while leaving *C. capsularis* strictly alone.

Fifty pounds green weight of each variety were retted and resulted in *C. capsularis* yielding 46.5 ounces of fibre and *C. olitorius* 25.6 ounces. Results would indicate that *C. capsularis* is much the better variety. All available seed was harvested.

Pre-emergence Sprays

Further work has been done with 2,4-D sprays, and many farmers are now trying out this type of weed control. Although there are some commercially built spray outfits available, many growers are successfully building their own and it appears that the use of hormone type sprays will definitely have a place in the economy of cane growing.

Disease Trials

Two randomized block trials were planted during the year, one in Mulgrave and one in Babinda, to determine losses due to chlorotic streak disease.

Seedling Work at Babinda

Work at the sub-station was continued during the year. Three "I" varieties (I.426, I.405, and I.421) were selected from the yield-observation trial and planted in a randomised block with Badila as a standard. Five "J" varieties (J.418, J.419, J.422, J.423 and J.426) were selected from the 40-sett plots and planted in a yield-observation trial with Badila and H.Q. 426 as standards.

Fifteen "K" seedlings together with eight "J" seedlings were selected from the 2-sett plantings of original seedlings and planted in 40-sett plots. Approximately 1,000 "L" original seedlings were also planted out in 2-sett plantings, making a total of some 2,000 stools.

Experiments Harvested during the 1950 Season

Five seedling trials were harvested during the year. These consisted of a plant trial in the form of a randomised block on Division A.5, a first ratoon randomised block on Division A.3, two plant yield-observation trials—one on Division A.1 and one on Division E.2 and one ratoon yield-observation trial on Division A.5.

In the plant randomised block on Division A.5, G.262, G.270, G.273, G.323, and G.362 were compared with Trojan and the trial harvested at 13 months. G.273 with 47.03 tons per acre at 16.0 c.c.s. gave 7.5 tons of sugar per acre and was the only variety to exceed Trojan which yielded 42.79 tons per acre at 16.9 c.c.s. and gave 7.2 tons of sugar per acre. Other yields were G.270, 43.49 tons at 15 c.c.s., G.362, 41.82 tons at 15.2 c.c.s., G.262, 38.47 tons at 16.6 c.c.s., and G.323, 32.77 tons at 16.2 c.c.s. In all ways G.273 appears to be outstanding and the results of the ratoon crops are awaited with interest.

LOWER BURDEKIN SUGAR EXPERIMENT STATION

G. A. CHRISTIE, Senior Adviser, Officer in Charge.

CROP GROWTH REPORT

The installation of meteorological equipment has not yet been finalised at this Station, and since rainfall records are available only over the last few months of the year, the data from Ayer Post Office are given below:—

RAINFALL RECORDS TAKEN AT AYR POST OFFICE, FROM 1ST JULY, 1950, TO 30TH JUNE, 1951.

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	Total
Inches ..	12.39	..	.11	.19	6.61	2.58	34.35	4.81	1.79	.56	1.99	.43	65.81
Wet Days ..	16	..	2	4	9	12	25	9	6	3	4	2	92

The year under review was a most unusual one with a good distribution of rainfall. The total of 65.81 inches exceeds by about 25 inches the average annual rainfall for the district. Normally the winter and spring months are dry, but this year the wet month of July seriously affected the late autumn plant cane and caused delays in the crushings at mills in the district. Rain in November and December also interrupted crushing and interfered with the normal cultivation practice of "hilling-up" cane rows on many farms. It also restricted to some extent the use of benzene hexachloride for the control of greyback grubs. The wet season was comparatively light after the 34 inches recorded in January, and no strong winds occurred to affect standing crops.

The early cessation of the wet season allowed early preparation of land, and on many farms in the district the 1951 autumn planting was completed before the cool winter weather commenced. As often happens in a season of good rainfall in this irrigated district, crops for 1951 harvest appear to be below the usual standard.

Blocks on the Experiment Station in general made reasonable progress, though what appears to be nitrogen starvation was observed early this year in some patches, particularly where surface soil was graded to produce slopes suitable for irrigation. In addition, crop growth was restricted by our inability to irrigate for some time following the wet season, due mainly to the fact that the underground water rose to a particularly high level. Many pumps, including the Experiment Station unit, were under water for a long period.

Up to the end of June the Station crop for 1951 harvest received five waterings, one of which was found later to be unnecessary since it was followed by heavy rain. The yields are expected to compare very favourably with crops in the locality, most of which were planted earlier and received more irrigation than Station blocks.

WORK OF THE STATION

During the year 3,199 original seedlings, selected seedlings from the Northern Sugar Experiment Station which came via the Northern and Clare Isolation plots, and a number of standard varieties for the supply of planting material were planted on Block B. A small area of varieties received from Brisbane quarantine house was also planted. On Block E. a trial was planted with the varieties G.208, G.237, G.273, G.323, G.324, B.331, 40 S.N.1133 and S.J.16 as standard. In addition the 40-sett plots containing 75 canes selected from the original seedlings planted in 1950 and propagation plots to build up stocks of a number of varieties for further testing were planted out.

At the end of June, 1951, about 2,000 original seedlings had been transferred from pots to the field on Block A.2, and early in July this transplanting was completed, making a total of 6,240 seedlings in the field.

Apart from maintaining growing crops, timber has been cleared from Block A.I and the southern end of Block E. The 15 inch concrete pipeline has been extended a further 8½ chains and a considerable amount of time has been spent in levelling all fields to facilitate irrigation. Shortage of suitable farm labour has restricted many of the Station's activities and the area planted has had to be limited for this reason. The only cane cut by the end of June was that which was required for plants, approximately 15 tons. This was used for station planting and for district propagation plots.

CENTRAL SUGAR EXPERIMENT STATION

C. G. STORY, Senior Adviser, Officer in Charge

METEOROLOGICAL AND CROP GROWTH REPORT

The adverse weather conditions of the 1950 harvesting season will be long remembered by canegrowers. The frequent wet periods were in direct contrast to the comparatively dry 1949 harvesting season and commenced with a record rainfall of 1,279 points for July, 1950, compared with only 25 points in July, 1949. With the onset of this heavy rain on July 9th, the whole agricultural and harvesting programme was upset for the remainder of the month. Mills crushed only on odd days and a large tonnage of cane, which should have been harvested, remained in the field. Many fields were waterlogged and the surface water remained for long periods as all main drains were overloaded. When it was possible to harvest cane, canegrowers improvised various methods of removing their crops from the fields and by the end of the first week in August, most of the canegrowers had overcome their transport difficulties. Twisted cane with consequent light loading added to the problem. Canegrowers started their long delayed cultivation and planting programme during the middle of August, and continued throughout September, but field labour shortages hampered progress and necessitated working throughout each week-end to complete the planting. Unfortunately it was impossible to foresee that most of this plant cane would yield less than ten tons per acre for the 1951 harvest.

Fortunately rainfall at the Experiment Station during September and October was below that which occurred in other parts of the area. Some of the heaviest October rain received for many years was recorded in the Balberra and Sunnyside areas with falls of up to 6½ inches on the 7th, and a total of 11 inches for the first fortnight. These weather conditions again interrupted the harvest for various periods. Ratoon cane and weeds made good progress with the hot sultry days which were typical of summer conditions, and the standing cane maintained its condition. Rainfall again interrupted the cane harvesting programme in November and crushing ceased for various periods. On the 16th of the month, Carmila, Uruba and Tannaloo experienced a severe hailstorm which damaged crops and property. Weather conditions enabled ratoon cane and weeds to make further growth during the month. A large number of canegrowers were forced to sacrifice any opportunity of cultivating cane in order to attend to the main object, i.e., harvesting the crop. The late planted cane had germinated slowly and only those blocks which had been cultivated made any progress. The district's harvesting programme was again interrupted by rain in December, but cane made good progress during the month although cultivation was upset by weather conditions.

Total rainfall at the Experiment Station for the six monthly period July to December, 1950, was 30.94 inches compared with 9.76 inches for the same period in 1949. The total for the calendar year 1950 was 106.66 inches, with one district, Sarina, receiving a total of 133 inches for the year. Mackay Experiment Station rainfall records since 1901, show that only on three other occasions have over 100 inches of rain been received for the calendar year: 1910 (100.87 inches), 1918 (114.18 inches), 1936 (104.19 inches). During January, 1951, when the flood rains occurred, most of the district centres received the equivalent of the average annual rainfall in a period of one week. The whole district was flooded, transportation was at a standstill, with heavy damage to roads in the area, while many alluvial blocks were damaged by erosion. The rainfall registered at the Experiment Station during January was 65.12 inches; a fall of 60.64 inches for one week is the highest on record since 1901. Portion of the Station land was under water for five days and the heavy rain was accompanied by strong winds. Other district centres had higher registrations and a large quantity of cane, estimated at 317,000 tons, remained in the field when crushing ceased in the central district.

Station cane made rapid progress during the last fortnight of January. The rainfall for February was well below average and by the end of the month rain was required, as the land had set hard on drying out, following the torrential rainfall of January. Under the existing high temperature conditions the crops on the Station made some progress except in blocks with a sandy soil type. March rainfall was the lowest since 1943 and was well below the average. Dry conditions continued in April, the only rain received being one light fall on the last day of the month. The district crop is down in tonnage due to seasonal conditions and the resultant poor plant crop. The Shoal Point-Eimeo area received heavy rainfall in May, but the rest of the area was not so fortunate. During May temperatures dropped and the Gargett area experienced a heavy frost on the 14th. Two further frosts occurred during the last week in June, but no damage was reported.

Total rainfall for the first six months of 1951 was 76.69 inches, with a total of 107.63 inches recorded on 120 days for the twelve monthly period ending June, 1951. A feature of the 1951 season was the lateness of arrowing.

The earliest recorded beetle flight occurred about the 20th November, 1950, with the main one during the second and third weeks of December. These appeared to be smaller than in 1949. Analysing greyback grub damage for the 1950 season the outstanding feature was the phenomenal success achieved by the application of B.H.C. in 1949. All treated fields were free from grub damage, while damage in adjacent untreated fields was considerably lessened by favourable growing conditions.

Unfortunately adverse seasonal conditions during 1950 prevented complete application of B.H.C. for the protection of the 1951 crop, and grub damage in this crop is widespread, particularly in the Cattle Creek and North Coast areas. There were odd cases of severe "frenchi" grub infestation. Rat damage was unimportant in 1950, but rats are more prevalent in 1951 than in previous years. The wireworm damage was reported and that caused by wallabies was negligible.

The following meteorological observations were made at the Station during the year.

ANNUAL RAINFALL SINCE 1935 AT THE SUGAR EXPERIMENT STATION, MACKAY.

Year	Rainfall in Inches	Year	Rainfall in Inches
1935-36	99.57	1943-44	58.67
1936-37	64.21	1944-45	33.53
1937-38	47.21	1945-46	68.52
1938-39	61.29	1946-47	48.09
1939-40	82.86	1947-48	38.40
1940-41	73.71	1948-49	46.95
1941-42	57.75	1949-50	85.48
1942-43	76.13	1950-51	107.63

Average for 16 years—65.62 inches.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT THE CENTRAL SUGAR EXPERIMENT STATION, MACKAY, DURING PERIOD 1ST JULY, 1950, TO 30TH JUNE, 1951.

Month	Rainfall (Inches)	No. of Wet Days	Shade Temperature						Mean Diurnal Range	Mean Tempera- ture 9 a.m.	Mean Per Cent. Relative Humidity 9 a.m.
			Maximum			Minimum					
			High	Low	Mean	High	Low	Mean			
1950											
July ..	12.79	16	77.5	66.5	72.7	68.0	43.0	59.5	13.2	68.1	86.0
August ..	1.20	6	78.0	63.5	72.95	63.0	42.5	51.65	21.3	65.8	71.0
September ..	0.29	3	82.0	74.0	77.55	63.0	42.0	55.76	21.79	71.58	70.0
October ..	3.95	10	86.5	76.0	81.95	72.5	48.5	62.66	19.29	76.98	69.0
November ..	7.63	10	92.0	78.0	82.88	73.5	58.0	66.95	15.93	78.86	69.0
December ..	5.08	16	93.0	76.5	82.9	73.0	61.5	68.5	14.4	78.6	80.0
1951											
January ..	65.12	18	91.5	76.0	83.2	74.5	60.0	69.3	13.9	78.5	82.0
February ..	4.77	16	92.0	79.0	83.7	74.5	62.5	68.4	15.3	79.7	80.0
March ..	2.59	11	93.0	79.0	85.9	73.5	62.5	71.0	14.9	79.1	76.0
April ..	0.38	1	93.5	79.0	84.7	68.0	53.0	60.2	24.5	79.8	65.0
May ..	2.16	7	81.0	72.5	77.63	64.0	40.5	53.66	23.97	70.35	69.0
June ..	1.67	6	81.5	66.5	75.4	62.0	37.0	50.2	25.2	64.7	76.0
Totals	107.63	120	..	..	..	..	..	..	..	..	..

WORK OF THE STATION

Experiments Harvested during 1950 Season:—

Six varietal trials were harvested during the 1950 season. These were a plant randomised block trial including Q.56, E.129, E.135, Q.47 and Q.50; a plant randomised block trial including six "G" seedlings and Q.50; a yield observation trial on plant cane with "I" Seedlings, N.Co. 310, D.225 and Q.50; a first ratoon randomised block trial including "F" seedlings Q.28 and Q.50; and a first ratoon randomised block trial with Co.301, C.P.29/116, Pindar, Q.47, Q.49 and Q.50. In addition to these, section (1) of a long range trial to measure the effect of various crop rotations on soil fertility, a trash trial, and "ratoon stunting" disease trials in isolation, were harvested.

The six varieties in the plant randomised trial made good progress, with excellent growth in February, 1950, but Q.47 was below the standard of the other varieties. At harvest in October, 1950, Q.50 gave the best results with 6.88 tons of sugar per acre, but it only slightly exceeded Q.56. The early maturity of the Q.56 would have given it an advantage if the trial had been harvested in July or August, when it was one and a half units ahead of Q.50. Q.50 and Q.56 exceeded E.119, E.129, E.135 and Q.47 at the 5 per cent level of significance, while Q.50 also exceeded these varieties at the 1 per cent level. Q.56 was superior to E.135 and Q.47 at the 1 per cent level. The yields of the other varieties in tons of sugar per acre were E.119 (5.75), E.129 (5.65), E. 135 (4.44), and Q.47 (4.30).

The second plant randomised trial contained "G" Seedlings (101, 104, 105, 112, 176, 177) and Q.50. This cane made good progress from November, 1949, until it was harvested in August, 1950. At harvest G.105 gave the best results with 5.82 tons of sugar per acre, thus exceeding all other varieties at the 5 per cent. level of significance and all except Q.50 at the 1 per cent. level. The yields of the other varieties in tons of sugar per acre were: Q.50 (5.11), G.101 (4.95), G. 112 (4.86), G.176 (4.85), G.104 (4.20), G.177 (4.14).

The yield observation trial on plant cane included 26 "H" seedlings and B.331 with Q.50 as the standard variety. The trial made good progress and was harvested in September, 1950, at the age of 14 months. Q.50 was superior to all varieties in yield but six "H" seedlings, H.106, 117, 126, 130, 143 and 185, were selected on early sugar figures for further trial.

A second yield observation trial on plant cane included 26 "I" seedlings, N.Co.310, D.225 and Q.50. These varieties made good progress until harvested in September, 1950, at the age of 13 months. Maturity tests indicated that L.106 and N.Co. 310 were very high in sugar early in the season, and these figures were maintained. Selections for further trial will be made from the first ratoon crop.

The first ratoon randomised trial contained "F" seedlings (124, 135, 160, 184, 186) Q.28 and Q.50. The cane ratooned well and made good progress, but comparative differences between the varieties were noticeable in February, 1950. The trial was harvested in August, 1950, at the age of 10 months. Q.50 gave the best results with 5.12 tons of sugar per acre and significantly exceeded all other varieties at the 5 per cent level, and all varieties except F.124 at the 1 per cent. level. The yields of the other varieties in tons of sugar per acre were: F.124 (4.43), F.135 (4.38), Q.28 (3.70), F.186 (3.52), F.160 (3.41), F.184 (2.93). Q.50 gave a total yield of sugar per acre for the plant and ratoon crops of 10.42 tons compared with 8.98 for the next variety, F.124. Q.28 was well below Q.50 for performance, with a total of 7.29 tons.

A first ratoon randomised trial included Co.301, C.P.29/116, Pindar, Q.47, Q.49, and Q.50. This trial was ratooned in October, 1949. Q.50, Co.301, and C.P.29/116 showed by far the greatest vigour and produced a better tonnage in the ratoon than in the plant crop. The performance of the other varieties, particularly Pindar, was poor. The trial was harvested in October, 1950, at the age of 12½ months. Q.50 gave the best results with 6.29 tons of sugar per acre, thus exceeding C.P.29/116, Q.47, Q.49, and Pindar, at the 1 per cent. level of significance. The yields of the other varieties in tons of sugar per acre were: Co.301 (5.99), C.P.29/116 (5.50), Q.47 (4.13), Pindar (3.71) and Q.49 (3.31). The variety Q.50 gave a total yield of sugar per acre for the plant and ratoon crops of 10.38 tons compared with yields of 9.49 tons for Co.301, 8.80 tons for C.P. 29/116, and 7.65 tons for Pindar.

The first ratoon crop of Q.50 on section 1 of the long range trial was harvested and ratooned. The first cycle of this trial will be completed in 1951.

The plant crop of the trash trial was harvested and the trash was conserved on alternate interspaces.

Legumes

The perennial legumes Centro, Puero, and Stylo, which were planted at the end of December, 1949, were established by March, 1950, but the Centro did not make any progress until September. Stylo and Puero made excellent growth, but apparently Centro requires a long period for establishment as it did not make good progress until January, 1951. The three varieties were not affected by dry weather conditions and Stylo and Puero produced very good cover crops. Puero and Centro vines were damaged by frost but only the tips of odd plants of Stylo were affected. These legumes would be good cover crops on areas which are not required for cultivation for long periods. Stylo flowered in August, 1950, and May, 1951.

As in previous years velvet bean crops proved their worth in the farm rotation, as these legumes do well under abnormal conditions. Planting out of season is most suitable for seed production.

Alexandra Seedling Plots

A yield observation trial of "IP" Seedlings from the Lansdowne Road Seedling Plots and first year selections from the Experiment Station, were planted on this seedling sub-station on alluvial soil. The 40 sett plots of "J" seedlings planted in 1949 were ratooned.

Plant Introduction

New varieties introduced from Quarantine during the year were Co.475, Co.617, C.P. 36/183, F.108, P.O.J.2967, P.O.J.3016, 38 S.N. 473, 40 S.N. 1618, 40 S.N. 5798, Tuc. 3950, Tuc. 4535, and Tuc. 4624.

Jute

One-quarter of an acre of Jute (*Corchorus capsularis*) was planted on 24th November, 1950. It showed the effects of dry hot weather conditions, but withstood flooding in January, and reached an average height of 4' 6" by the end of February. Five pounds of seed were collected by hand from this particular area.

Weedicide Trials

A field trial with 6 treatments was established on 3rd October, 1950. The treatments were:—

- (a) Cultivation and pre-emergence spraying.
- (b) Cultivation, pre-emergence, and contact spraying.
- (c) Pre-emergence, cultivation, and contact spraying.
- (d) Pre-emergence, and contact spraying, no cultivation.
- (e) Cultivation only.
- (f) Check—no spray or cultivation.

All the initial sprays were made with 2, 4-D at the rate of 4 lbs. per acre and subsequent sprays were a contact plus pre-emergence spray consisting of creosote and pentachlorophenol plus 2, 4-D at the rate of 4 galls. per acre. Applications were made with a knapsack spray.

The cultivation treatments were handicapped by wet seasonal conditions, but outstanding results were obtained by spraying only. The last spraying treatments were given at the end of December, 1950, and despite being under water for five days in January, 1951, the area of this treatment was comparatively clean at the end of June with no crop of *G. ageratum* as existed on the other treatments. The results of this trial emphasise the value of chemical weed control under wet seasonal conditions, when it would be impossible to cultivate successfully, but when a tractor could operate with spraying equipment over the undisturbed surface of large areas.

A trial to measure the effects of sodium trichloroacetate in controlling Guinea grass was established, using rates of 25 lbs., 50 lbs. and 100 lbs. per acre. The higher rates of application have possibilities as the 100 lbs. per acre treatment has given practically complete control of stools of Guinea grass.

Experiment Initiated During the Year

These included a yield observation trial with 29 "J" Seedlings, 11 introduced canes and Q.50 as the standard; a Filter Press Mud and Fertilizer Trial; a Soil Improvement Trial, and a Weedicide Trial. In addition, a "ratoon stunting disease" trial was planted in isolation and preliminary work was commenced for the preparation of a further area for a similar planting. Seedling selection in the 1950 crop resulted in the selection of 167 seedlings, which were subsequently planted in 40 sett plots.

Field Day

Field Day

The 1951 Field Day was held at the Mackay Sugar Experiment Station on 22nd May. There was a record attendance of approximately 550 canegrowers, who were conducted on a tour of the station by members of the Bureau staff. Considerable interest was shown in an excellent display of implements and tractors, together with the Rassmussen and Rolleston cane harvesting machines.

LABORATORY WORK

The following is a summary of the c.c.s. analyses carried out during the year:—

Station maturity and trial cane samples	..	..	..	..	1,061
Farm Trials	..	..	..	..	230
Farmers' samples	..	..	..	..	31
Show Canes	..	..	..	..	41
					1,363

SUMMARY OF CROPS GROWN ON STATION.

[illegible]

SOUTHERN SUGAR EXPERIMENT STATION

H. G. KNUST, Senior Adviser, Officer in Charge

METEOROLOGICAL AND CROP GROWTH REPORT

Unusually wet conditions during July caused considerable delay to harvesting. The extremely wet condition of the soil as the result of flood rains which fell during the last week of July affected ratooning and as a consequence ratoon shoots came away slowly and patchily. Comparatively dry conditions throughout August favoured ratooning and ratoon shoots came away and grew rapidly toward the end of the month. Three successive light frosts which occurred during the second week of August did not harm crops. Good rainfall was recorded during October, November, and the first week of December, and a comparatively dry spell prevailed until the second week of January. Since the beginning of February rainfall has been spasmodic and insufficient for crop requirements.

Crops grew quite well during August, and although slightly affected by the dry spell during September responded well to the good rainfall during October and November, when indications were that yields for the 1951 harvest would be good. Growth rate decreased during the latter part of December and the early part of January and remained good until late February. From the end of February growth rate was poor and cane in many fields in the drier and elevated parts of the district showed drought distress by the end of April and had deteriorated further by the end of June. District yields will be well below those anticipated at the end of January and will be much less than yields for 1950. Arrowing at the end of June was extremely sparse and should not affect yields.

RAINFALL RECORDS, 1914-1951.

Year	Rainfall in Inches				Year	Rainfall in Inches			
1914-15	..	..	..	31.99	1932-33	..	..	..	36.81
1915-16	..	..	..	28.54	1933-34	..	..	..	71.45
1916-17	..	..	..	58.08	1934-35	..	..	..	40.01
1917-18	..	..	..	49.85	1935-36	..	..	..	44.24
1918-19	..	..	..	24.24	1936-37	..	..	..	31.65
1919-20	..	..	..	28.20	1937-38	..	..	..	44.40
1920-21	..	..	..	45.16	1938-39	..	..	..	41.01
1921-22	..	..	..	44.97	1939-40	..	..	..	41.69
1922-23	..	..	..	37.14	1940-41	..	..	..	43.26
1923-24	..	..	..	34.16	1941-42	..	..	..	33.52
1924-25	..	..	..	50.96	1942-43	..	..	..	40.75
1925-26	..	..	..	37.62	1943-44	..	..	..	45.22
1926-27	..	..	..	68.18	1944-45	..	..	..	28.14
1927-28	..	..	..	74.69	1945-46	..	..	..	26.10
1928-29	..	..	..	31.16	1946-47	..	..	..	44.52
1929-30	..	..	..	43.16	1947-48	..	..	..	57.76
1930-31	..	..	..	47.19	1948-49	..	..	..	40.18
1931-32	..	..	..	22.88	1949-50	..	..	..	59.31
					1950-51	..	..	..	50.74

Average for 37 years—42.66 inches.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS MADE AT THE SOUTHERN SUGAR EXPERIMENT STATION, BUNDABERG, FROM 1ST JULY, 1950, TO JUNE, 1951.

Month	Rainfall (Inches)	Wet Days	Shade Temperatures						Mean Diurnal Range	Mean Tempera- ture 9 a.m.	Mean Per Cent. Humidity at 9 a.m.
			Maximum			Minimum					
			High	Low	Mean	High	Low	Mean			
1950											
July	14.11	19	75	65	71.51	66	42	53.36	18.15	62.45	88.5
August .. .	.31	7	76	65	71.40	61	37	48.80	22.60	59.16	72.16
September ..	.18	2	79	72	75.75	61	47	53.79	21.96	64.72	67.9
October .. .	5.81	7	83	73	78.66	71	50	61.16	17.50	70.8	71.5
November ..	8.18	11	92	76	80.13	72	54	64.10	16.03	72.93	72.76
December ..	1.83	9	88	75	82.58	72	58	66.58	16.00	75.51	70.9
1951											
January .. .	12.53	15	90	73	81.84	75	60	67.87	13.97	75.48	79.45
February ..	1.51	10	88	78	82.65	72	62	66.96	15.69	75.26	78.85
March .. .	2.73	14	89	75	82.38	75	62	66.8	15.58	75.16	77.66
April .. .	1.81	5	85	77	80.33	70	45	56.56	23.77	68.68	70.01
May .. .	1.10	3	78	63	74.00	62	37	46.17	27.83	60.72	71.86
June .. .	.64	5	77	61	71.9	65	45	51.23	20.67	59.26	82.66
Totals .. .	50.74	107	..	..	..	..	..	..	..	..	..

Pre-planting treatment of cane setts with mercurials is receiving greater attention from growers and should soon become more widely used. Poor strikes due to pineapple disease in autumn plant cane were recorded only on farms where pre-planting treatment with mercurials was not practised.

Successful chemical weed control as practised on the station has encouraged growers to become interested in this form of weed control. Many are constructing or purchasing power driven spray equipment for attachment to a tractor and propose practising this method during the next growth period.

WORK OF THE STATION

Field day was held on 2nd April and the attendance of 400 growers and other visitors connected with the industry was highly satisfactory. Bureau Officers, acting as guides, conducted all visitors on a tour of the Station. The excellent display of tractors and implements also attracted growers and much interest was shown in the demonstration of the power boom-spray.

Plant Distribution

A distribution of Q.55 and Pindar was made to growers in the Bingera, Fairymead, Gin Gin, Millaquin and Qunaba areas during the spring of 1950. In all, 422 applications were received and 540 tons of cane distributed. An additional $6\frac{1}{2}$ tons of Vesta was distributed in the Gin Gin area.

Plant Introductions

New varieties, P.O.J. 2967, P.O.J.3016, C.P.36/183, Co.475, Co. 617, Tuc.3950, Tuc. 4535, Tuc. 4624, F.108, 36 S.N. 4995, 38 S.N. 473, 40 S.N. 1618 and 40 S.N. 5798, were introduced from quarantine during the spring of 1950 and planted in Block C. 1.

Seedling selection in the original "K" seedlings was carried out during August, 1950. A total of 166 seedlings were selected and subsequently planted in 30-sett plots in block A 3.

Fifty-seven selections comprising "J" seedlings and canes introduced from Mauritius and from Colonial Sugar Refining Company were made from the plant 40-sett plots in Block D 1. These, with three "I" seedlings selected from the 40-sett ratoon plots in E 1, were planted in yield observation trials with Q.47 as the standard in Blocks D. 2 and F.

Disease Trial

The downy mildew resistance trial conducted in isolation on the Elliott River yielded satisfactory information and is fully reported elsewhere in this Annual Report.

Experiments Harvested During 1950 Season

Most of the experiments harvested during the year were of the usual type associated with seedling production, selection, and testing.

The first ratoon randomised trial with ten "F" seedlings ("F" 14, 16, 18, 25, 27, 31, 33, 35, 49, 60) did not reveal any seedling of commercial promise.

The plant randomised trial with eight "H" seedlings ("H" 1, 3, 17, 18, 24, 47, 52 and 83) and two "F" seedlings—F.30 and F.55 on Block B. 1 produced good yields. All canes out-yielded the standard Q.47 in tons of sugar per acre, but some have to be discarded because of undesirable disease reactions. H.18, 24, 47 and 52 were selected as showing the most promise and are now being tested in trials off the Station.

Yields from some of the "H" seedlings being tried with Q.49 in the first ratoon yield observation trial on Block E. 2 were satisfactory and several selections have been made and planted in propagation for future trial work. Parentage of seedlings selected were H.4, H.6—(P.O.J.2878 x Co290); H.19, H.25—(Co281 x C.P. 29/116); H.42, H.45, H.46, H.62, H.64—(Co281 x P.O.J.2878).

Thirty-one "I" seedlings, N.Co310 and C.P.34/79 were tested against Q.47 in a plant yield observation trial in block A 1. Yields of sugar per acre in Q.47 varied from 5.43 tons to 6.18 tons and this was exceeded by 27 of the seedlings and N.Co310. The best yield was obtained from I.70 which gave 10.32 tons of sugar per acre. This cane is a non-arrowing late maturer which remained erect, although yielding 71.69 tons of cane per acre, and ratoons strongly. Selections will be made from this block during the first ratoon cycle.

The second ratoon crop of the third cycle of the rotational trial was harvested from treatments 2 and 3 on Block B. 4, treatment 1 being under long term fallow with legumes. This long-range experiment was first planted in Autumn, 1938. The design has been fully described in previous Annual Reports and the following description of the layout will suffice:—

The trial consists of three rotational treatments—

- (1) Eighteen months fallow with legumes followed by a plant and one ratoon crop of cane.
- (2) Six months fallow with legumes followed by plant, first and second ratoon crops; and
- (3) Similar to (2), but in the replanting of the trial at the end of the crop cycle the original variety is replaced by a fresh variety.

Yields of cane from the crop cycle just completed were (1) 79.45 tons per acre; (2) 121.05 tons per acre, and (3) 111.22 tons per acre.

The second ratoon crop of the permanent trash trial harvested from Block E.3a completed the fifth rotation of this experiment. Again there are no indications of any increase in

yields from trash conservation on this red volcanic soil type under southern climatic conditions. Following are details of yields since the trial was established.

Year of Harvest	Variety and Class	Trash Plots		No Trash Plots	
		Cane per acre	Sugar per acre	Cane per acre	Sugar per acre
		tons	tons	tons	tons
1934	Q.813 Pl.	36.2	5.83	36.2	5.68
1935	Q.813 1st R.	9.4	1.24	13.1	1.69
1937	P.O.J.2725 Pl.	19.1	3.11	18.6	3.11
1938	P.O.J.2725 1st R.	39.5	5.53	34.7	5.03
1939	P.O.J.2725 2nd R.	30.9	4.85	29.0	4.41
1941	P.O.J.2878 Pl.	44.0	6.42	43.9	6.25
1943	P.O.J.2878 S/O 1st R.	42.9	6.48	43.6	6.67
1946	P.O.J.2878 S/O A.P.	15.7	1.95	17.1	2.09
1948	Q.49 Pl.	42.1	6.38	44.9	6.88
1949	Q.49 1st R.	30.7	4.15	29.7	4.08
1950	Q.49 2nd R.	37.4	4.54	37.1	4.47

The second ratoon crop harvested from the rotary filter mud plus fertilizer trial on Block E.3b yielded an average of 35.43 tons of cane per acre with an average yield of 46.22 tons of cane per acre for the three crops harvested. When the plant crop of this trial was harvested in 1948, the yield figures indicated that neither the application of mud nor fertilizer dressings brought about an increase in tons of cane or sugar per acre. This was not unexpected since these red soils often do not require fertilizer for the plant crop particularly when the preceding crops have been adequately fertilized. However, when the first ratoon crop was harvested there was again no clear cut response to fertilizer or mud. Nevertheless, there were indications that the dressing of 2 cwt. of fertilizer and the 50 ton application of filter mud were beginning to have some beneficial effect. When the second ratoon crop was harvested the beneficial effect of the fertilizer dressing was sustained and significant responses were obtained at the 1 per cent. level while no significant response obtained from the mud applications.

Yields from the plant crop of the fourth rotation of the fertilizer and plant residue trial on Block E. 4 provided some interesting results. This trial was first planted in March, 1938. The trial area is divided into six blocks, and on two of these the trash is burnt at harvesting, on another two the trash is also burnt but a green manure crop is grown prior to planting, while on the remaining two blocks the trash is turned into the soil and a green manure crop also grown. A fertilizer experiment involving the use of (a) no fertilizer, (b) potash, (c) phosphoric acid plus potash is superimposed for the plant crop, while for the ratoon crops the following treatments are superimposed, (a) no fertilizer, (b) nitrogen plus potash, (c) phosphoric acid plus potash, and (d) nitrogen plus phosphoric acid plus potash. In the yield of cane per acre, trash and green manure exceeded the yields of both no trash and no green manure and no trash but green manure at the 5 per cent. level of significance, while potash, and phosphoric acid plus potash, exceeded the no fertilizer treatment at the 1 per cent. level. In the yield of sugar per acre, trash and green manure exceed no trash and no green manure at the 5 per cent. level of significance, while potash exceeded the no fertilizer treatment at the same level and phosphoric acid plus potash exceeded the no fertilizer treatment at the 1 per cent. level.

New Experiments Initiated During the Year

A benzene hexachloride-fertilizer trial was established in Block E.3b for the purpose of measuring whether any inhibition of the uptake of fertilizer by the cane plant occurred due to the presence of the insecticide.

Weedicides

Full scale field trials using 2,4-D as a pre-emergence spray were established on Block A. 1, Block B. 3, and Block E. 2. Application of the weedicide was made with the power spray equipment attached to the tractor. Control of weed and grass seed germination was as effective when the 2,4-D was applied with 20 gallons of water per acre as when applied with 40 gallons per acre. Control of subsequent light, patchy germination of grass and weeds was successfully effected by spot-spraying with a creosote base contact spray combined with 2,4-D and pentachlorophenol.

Contact weedicides tried for controlling young grass and weeds consisted of (1) pentachlorophenol; (2) creosote base containing 2,4-D; (3) creosote base containing 2,4-D at a constant level but with three levels of pentachlorophenol; (4) creosote base containing a higher level of 2,4-D than (3) and pentachlorophenol; (5) emulsified diesel oil base with a combination of 2,4-D and pentachlorophenol (6) mineral oil base, particularly high in aromatics, with a combination of 2,4-D and pentachlorophenol. Satisfactory control was obtained from the creosote base combined with a fairly high level of 2,4-D and pentachlorophenol and with treatments 5 and 6. Further trials will be carried out during the coming spring and summer months.

Station and trial cane samples	..	..	..	..	..	..	..	894
Farmers' cane samples	..	..	..	..	..	..	..	184
Irrigation waters	..	..	..	..	..	..	..	22

Varieties harvested	1950 season	Tons
Q.47		27·55
Q.49		310·675
C.P. 29/116		74·6125
P.O.J.2878		124·625
Seedlings		520·7375
Total		1,058·2
Plant cane harvested		485·8875
Ratoon cane harvested		572·3125
Total		1,058·2
Total cane harvested for mill		1,022·0875
Used for samples and plants on Station		36·1125
Total crop		1,058·2
Total acreage harvested		25·234 acres
Average tonnage per acre		41·93 tons
Total area stood-over for 1951 season		2·0 acres

REPORT ON THE WORK OF THE FIELD STAFF

W. R. STERN, Asst. Agronomist

The work of field officers for the year, comprised the establishment, maintenance, regular observation and harvest of fertility, disease, fungicide, insecticide, weedicide, frost observation, minor element, germination and variety trials. In addition advisory work and inspections were carried out. The Queensland Society of Sugar Cane Technologists met at Bundaberg in April this year, and the work of the field staff for the current year was discussed at a staff conference held at the time.

GROWTH OF THE 1951 CROP

General

Conditions during spring and early summer were particularly wet, but not prolonged, as in the previous year. On the contrary, dry conditions generally prevailed from February onward, resulting in a deterioration of crop growth, and by the commencement of the 1951 crushing the cane showed distress due to dry weather. These conditions enabled growers to carry out cultivation and planting operations without interruption and a large proportion of next year's crop was planted prior to the commencement of this year's crushing. Winter temperatures during 1950 were extremely mild, but more severe temperatures were experienced during May and June of this year. Some frost damage did occur, but this was confined to the leaf surface.

Germinations

These have been reasonably satisfactory in all districts, although late autumn plantings suffered to a greater or lesser degree from pineapple disease. Fields planted early in spring germinated rapidly and became established, whereas those planted later were somewhat slower and more erratic due to the wet conditions that prevailed. Pre-planting treatment of setts by dipping in mercurial solutions is becoming still more widespread and many growers have devised methods of treating the cane to suit their own particular needs.

Ratooning

On the whole, cane cut from the 1950 crushing, more particularly the late cut cane, ratooned poorly. Stooling of ratoons was sparse and competition by weeds—which were encouraged by the wet conditions coupled with the inability to cultivate fields at the appropriate time—adversely affected the development of ratoons. Trojan appeared to be the worst affected cane. In some instances ratoons were either ploughed out and replanted or will be stood over to the following season.

Arrowing

This was neither as extensive nor as intensive as the arrowing that occurred last year. Heavy and early arrowing in the 1950 crop was responsible for side-shooting of several varieties with consequent loss of quality as the season progressed. In the north Pindar arrowed lightly, Eros early and Q.50 and Q.44 arrowed freely. In the southern districts C.P.29/116 and Q.47 produced side-shoots very early in the season, but Q.50, Q.55 and Pindar arrowed very little.

Following are more detailed notes on the 1951 crop in the various districts:—

NORTHERN DISTRICT

Until February, frequent light falls caused local floodings and impeded field operations for very brief periods at a time; however, with the dry conditions experienced early this year a considerable portion of next season's crop was planted by June.

Germinations of the 1951 crop were on the whole satisfactory. Early plantings particularly made good growth, especially on the red volcanic and schist soils, which are better drained. With later plantings germinations were slower and stooling somewhat poorer. The continued dry weather checked growth of Trojan and Pindar but Q.50 withstood the dry conditions well and to a greater degree than Badila and Cato. Lodging only occurred where there had been grub damage.

LOWER BURDEKIN

The early summer was wet and heavy falls occurred during November and January. Water lying in young cane fields during this period, particularly on low farms, caused damage to the current crop. Land preparation was inadequate to provide satisfactory planting conditions during autumn and with the rather long stretch of dry weather this year growers are irrigating their crops in order to obtain strikes.

CENTRAL DISTRICTS

Heavy rain during the latter half of 1950, with the exception of a brief respite in August-September, interfered severely with harvesting operations. During January exceptionally heavy flood rains occurred but cane made satisfactory progress until dry conditions set in in March. Trojan showed the effects of drought most severely and the growth of Q.28 and Q.50 was appreciably checked. Planting conditions in the late winter and spring months were not particularly satisfactory, but cane planted earlier this year germinated satisfactorily. Cane on hillsides and on sandy soils made generally better growth than on the less well drained soils.

SOUTHERN DISTRICTS

The winter of 1950 was characterised by mild temperatures and exceptionally wet conditions in July. August-September (as in the central districts) was dry, and permitted the resumption of planting operations. Though rains during October-November and early January gave promise of excellent cropping, subsequent dry conditions checked growth. Frost in May-June caused some leaf damage, but this was not extensive.

GREEN MANURE CROPS

Demand for seed of the better types of legume again exceeded the supply. A great demand exists in the northern areas for velvet bean varieties, and also Reeves' Selection, and Cristaudo Pea, but these types are practically unprocureable and varieties planted depended mainly on availability of supply. Green manure crops were not entirely successful due to a particularly wet period experienced in the early stages of growth and the development of wilt in the susceptible Poona Pea.

Damage caused by pod borer, coupled with the wet autumn and winter months resulted in an almost total loss of seed of the velvet bean crop in the Isis area. With drier conditions this winter it is estimated that approximately 10,000 lb. of seed will be available in the Bundaberg and Childers districts.

FERTILITY TRIALS

Seven fertilizer trials were harvested in conjunction with fertility surveys in the various areas. In addition a number of lime trials were set out in each district in order to determine the relative value of heavy broadcast applications as opposed to much lighter drill dressings.

In the far northern districts two of the first ratoon fertility trials showed responses to sulphate of ammonia. At Proserpine a first ratoon crop on alluvial sandy loam and a plant crop on forest sandy loam gave responses to nitrogen, and nitrogen and potash, respectively. On the red volcanic loam in the Isis district the response of a plant crop to potash was in doubt, but a marked increase in yield was shown by applications of sulphate of ammonia. In the Moreton area a second ratoon crop and a plant crop both responded to nitrogen.

MINOR ELEMENT TRIALS

These were set out in a number of localities extending from the far North to the Moreton area. The only significant response was to an application of copper sulphate to a growing crop at Mt. Pelion, near Mackay. Two series of pot trials were set out at Nambour to investigate the causes of "droopy-top" but it is as yet too early to make any comment on observations.

DISEASE TRIALS

A number of disease trials were set out in order to determine the actual losses caused. Six chlorotic streak trials were planted in the Cairns-Innisfail area and two in the Moreton district. In addition two mosaic trials have been established in the Moreton area and a number of ratoon stunting disease trials at Mackay. Three observation trials with leaf scald and two on the spraying of cane against yellow spot were set out in the Innisfail area.

Six new mercurials and one cadmium compound were tested against Aretan for fungicidal activity. Aretan appeared to give the best results.

INSECTICIDE TRIALS

Assistance was given to entomological investigations and a number of B.H.C. trials were set out in the Innisfail, Burdekin, and Bundaberg areas. The results of these are reported by the Division of Entomology and Pathology.

VARIETY TRIALS

Details of variety trials harvested during 1950 appeared in the April issue of the Cane Growers' Quarterly Bulletin and only the more important features are discussed here.

In the *Cairns district*, Q.50 and 41M.Q.779 both performed well on clay loam and loamy soil. In spite of its excellent performance, further propagation of 41M.Q.779 will be discontinued on account of its poor cover and bad habit of lodging. The disadvantages of Q.50 in the far Northern areas are its heavy arrowing propensities and its habit of lodging under good conditions, though this latter fault is not as serious as in 41M.Q.779. Three more variety trials have been planted, one at Mossman, one at Highleigh, and the other on river flat country. G.273, a promising seedling cane, has been incorporated in three trials and its behaviour under varying conditions will be observed with interest. The seedlings F.304, H.411, E.269 and E.275 have been discarded owing to poor sugar and lower productive capacity than the present standards. S.J.4, which has not been an approved variety since the outbreak of gumming disease in 1937, was re-introduced into the Mulgrave area in 1950 and was planted out for propagation on eight farms. Very close inspections of the cane were made at frequent intervals and where further plots have been planted a very stringent watch is being maintained to detect the development of any symptoms of gumming disease that may occur.

In the *Innisfail area*, one variety trial incorporating four "G" seedlings, G.208, G.362, G.270 and G.273, together with Pindar and Badila as standards, has been planted. Of the older seedlings under test E.269 and F.335 have been discarded. Twelve "G" seedlings are being propagated and of these G.208 and G.273 appear to show the most promise. Ragnar (formerly 40 M.Q.35), which was propagated in the Herbert River district, is being tested under a variety of conditions in the Innisfail area. Further propagation of 41 M.Q.105 has been discontinued owing to its susceptibility to leaf scald.

In the *Lower Burdekin*, portion of a first ratoon dispersed randomised trial was harvested, but the other portion was lost due to inadequate notice of harvest being given. However, in the portion harvested the performance of Trojan and Pindar was superior to that of Badila, B.212 and H.Q.426. As a result of its good performance in a number of different localities, B.331, the fate of which was in doubt last year, is being propagated further. G.208, G.237, G.273, G.323 and G.324 are being propagated in all mill areas; of these G.273 shows most promise and may ultimately become a commercial variety. Its c.c.s. in June was over a unit above that of S.J.16 and Badila, the standards of the district.

A germination trial to determine the effect of applying sulphate of ammonia to the growing crop some weeks before plants were cut was carried out on 9 farms, using Badila, H.Q.426, S.J.16, Pindar, and Trojan. Appreciable improvement in germination was noted on two trials only. For best results it appears that irrigation immediately after application of sulphate of ammonia is desirable.

Of the newer varieties Pindar is finding a place on many farms as a replacement for E.K. 28. Comus is also finding favour as a good late planted variety.

In the *Central districts*, three variety trials were harvested, and two trials stood over due to the very wet conditions in the area. On rich alluvial silt loam Trojan, Q.49 and Pindar performed significantly better than Badila. C.P.29/116 again showed its ability to perform well under adverse conditions. Q.56, though possessing poor cover, is a suitable cane for the poorer areas and has given very even stands on gravelly soils.

In the *Southern district* five variety trials were harvested and seven were planted in the Bundaberg area. The four F seedlings under test have all been discarded, including F.60, which was the most promising. H.17, H.18, H.47 and H.52 are being propagated further, and of these H.18 has compared more than favourably with the standards in all plantings. The Canal Point varieties, C.P.29/320, C.P. 34/79, C.P. 34/120, C.P. 36/13, C.P. 36/62, and C.P. 36/105 are considered unsuitable for South Queensland conditions due to poor tonnages and unsuitable type of growth.

A 9 x 3 randomised trial, including varieties H.19, H.20, H.25, H.42, H.45, H.46, H.62, H.64, and Q.49 as standard, was set out on the Woongarra red volcanic loam. Although germinations were good, dry weather earlier this year has very severely checked the growth and rendered harvesting a doubtful proposition.

Of the newer varieties, Vesta has proved to be a reliable germinator and a cane with good cover, suitable as a standover type. Trojan planted under good conditions and as a long growing crop has proved to be satisfactory, but due to its susceptibility to mosaic disease, it is considered that other equally suitable varieties are available for planting in those areas. The growth of N.Co. 310 has been promising during last season. Its vigour, stooling, cover, and frost resistance are good. Because of its early arrowing it may be more suited to autumn rather than spring planting. It is being further propagated to test its sugar productivity.

In the Moreton area Q.50 and Pindar produced better sugar per acre than Q.47. Pindar is suited to the silty alluvial loams and lends itself to early harvest.

Cane Breeding

By J. H. BUZACOTT, Senior Plant Breeder

A most unusual rainy season occurred in the Cairns district during 1950-51. Instead of a relatively dry early summer, followed by heavy rain in January, February, and March, protracted wet weather set in during mid-November, 1950. By the end of that month over 13 inches of rain had fallen, followed by a further 18 inches in December and 20 inches in January. Early in February the wet weather ceased and the total rainfall for February, March, April and May amounted to only 933 points. In effect, therefore, the wet season occurred at least two months earlier than usual and in addition the period following the wet season was more than normally dry. The result was that much of the late-planted and ratoon cane was stunted during the early growth period due to waterlogging of the soils, whilst later the soils dried out too much and lack of moisture became a limiting factor.

The arrowing of cane during 1951 was considerably affected by the abnormal conditions. Both the plant and ratoon plots of parent canes at Freshwater failed to grow and it was necessary to rely on Meringa for arrows. In general the arrowing was late and sparse, whilst few of the noble varieties flowered freely. Valuable breeding canes, such as Korpi, Q.13, and Q.27, showed little signs of flagging even by the end of June. Such, however, is our diversity of breeding material that, despite the poor arrowing season, 206 crosses were in progress by June 30th. In dry years considerable difficulty is experienced in keeping arrows of Co.290, P.O.J. 2725, and one or two other favoured parents; this year was no exception and worse drying-off has seldom been experienced. Large sections of Co.290 arrows died in the field while still young. As a result it was not possible to save much Co.290 seed and the variety was used mainly as a male with frequent replenishment of arrows. The Canal Point varieties, C.P.29/320, C.P.34/120, C.P.36/13, and C.P.36/105, some of which have early maturing characteristics, were used in a number of combinations, while the very early maturing N.Co.310 was also used in as many crosses as practicable. The number of crosses made—215—was slightly less than the total for the previous year. In future it is hoped to reduce this total considerably, and the results of many of the trial marriages performed this year should allow the discarding of a number of varieties whose value as parents is somewhat in doubt. From the crosses made it is expected that more than 600 bags of fuzz will be packed. This will not be in excess of requirements since, due to the relatively poor germination in 1950, stocks of 1950 seed were just sufficient to provide the necessary seedlings for all Stations. Furthermore, the germination of seed from the highly diversified parental material now used is generally poorer than that of many of the old noble crosses. This, it is understood, has also been the experience in other parts of the world. However, this greater diversity at the same time results in greater segregation of characters and consequent higher variability, a necessary feature of crosses if they are to be valuable for selection purposes.

In order to delay the flowering of a number of early arrowers, a lighting system was installed in 1951 on one block in which several such varieties were planted. Although delay in the installation of the system prevented the lights being used as early as planned, the interruption to the photoperiod from 19th February to 16th April delayed the arrowing of several varieties so that they could be used in crossing later in the season than usual. With one of the varieties, which it was desired to delay, no effect was achieved since initiation of arrowing had already taken place before the lighting system was ready for operation.

Fuzz storage in "Pliofilm" bags during the 1950 season proved highly successful and their use resulted in a considerable saving of labour, since fuzz tins had no longer to be cleaned out, repainted and rewaxed. In addition, a considerable saving in freight resulted. The purchase of a large refrigerator will also effect a considerable saving of time and labour, since all seed will now be cold-stored at Meringa instead of in the cold-room of a Cairns ice works. The refrigerator was put into operation during June, 1951, and will be used to store all 1951-produced fuzz.

At Bundaberg and Meringa, fuzz was sown during July, 1950. To suit their planting periods Mackay and the Burdekin require an early planting of seed and at Mackay fuzz was planted during March, 1951, whilst for the Burdekin, fuzz was planted at Meringa in the same month. The glasshouse for the Burdekin Experiment Station has not yet arrived from England, and until its erection the seedlings for that area will be raised at Meringa. Generally speaking, fuzz germination in 1950 was poor at all Stations. This was due to a combination of factors such as greater diversity of parents, unsuitable weather conditions during the crossing period and some storage trouble. It is to be expected that as more and more interspecific hybrids are used in the crossing programme germinations will become poorer than we have generally experienced in the past.

Seedling selection from the "K" series original seedlings yielded 140 seedlings at Meringa. Crosses which gave a high percentage of selections were G.323 x Badila, Q.10 x Q.27, Q.13 x Eros, and Q.13 x P.O.J.2878. These crosses produced, in general, canes with a higher brix than other families in the field. Selection of the "K" series at Babinda was rendered difficult by the low brix of the seedlings, due no doubt, to the very wet conditions experienced throughout the growing season. Q.27 x Badila gave the best performance of the crosses represented, and a total of 25 seedlings was selected. At Mackay Experiment Station 167 seedlings representing 45 families were selected and as usual P.O.J.2878 x Co.290 was the most successful cross. A total of 167 seedlings were made at the Bundaberg Experiment Station, these being representative of 28 families. Here G.217 x P.O.J. 2878, Trojan x Q.36 and D.209 x Q.31 gave the best

results. In addition to the selections for planting on the Experiment Station, 133 selections were made from 25 families and forwarded to Beerwah to be grown there and selected at a later date for the requirements of the Moreton district. From the seedlings introduced from Bundaberg to Beerwah during 1949, 51 selections were made from 17 families and planted in a stand-over trial on the Maroochy River lands.

At Meringa 22 "I" seedlings were chosen from the ratoon 40-sett plots as well as five from the plant "J" series, giving a total of 27 varieties which were planted in a yield-observation trial. At Babinda five varieties only were worthy of selection from the 40-sett plots and these also were planted in a yield-observation trial. Low sugar was again the critical factor in these Babinda selections. Twenty-nine varieties were planted out from the plant 40-sett plots at Mackay Experiment Stations in a yield-observation trial, whilst on the heavy soil type of Alexandra the "J" series 40-sett plots were ratooned for selection during 1951. From the first ratoon "I" series 40-sett plots at Lansdowne Road 12 varieties were selected for further planting.

Unfortunately this plot virtually failed due to unfavourable growth conditions and the varieties will probably have to be replanted in 1951. At Bundaberg, from the plant "J" series 40-sett plots 49 seedlings were selected for the yield-observation trial, and of these no less than ten varieties were of the parentage Trojan x P.O.J.2878. In addition, three varieties were selected from the ratoon 40-sett plots and also planted in the same yield-observation trial.

From the "I" series yield-observation trial at Meringa no selections were made, but two varieties, I.222 and I.245, were outstanding. Final selections will not be made until the ratoon crop is observed in 1951. Of the seven "I" varieties in a yield-observation trial at Babinda, I.405, I.421 and I.426 were planted in a randomised trial. The first two of these are of the parentage Q.27 x Badila, whilst the third is H.Q.426 x Q.27. The last-mentioned one appears the most promising. In the Mackay yield-observation trial of "I" seedlings the only varieties which gave a yield comparable with the standard Q.50 were I.114, I.115 and I.P.184. Final selection will be made on the ratoon crop. Some good yields were recorded in the "I" series plant yield-observation trial at Bundaberg; I.70 yielded at the rate of more than ten tons of sugar per acre, whilst I.8 and I.16 both exceeded nine tons; the highest figure from the control plots of Q.47 was seven tons of sugar per acre. Selections for planting in a randomised trial will also be made from the ratoons of this plot.

At Meringa the "H" series ratoon yield-observation trial was selected and as a result H.250, H.253, H.302, H.312 and H.365 were planted in a randomised trial, whilst H.231 was planted elsewhere for further observation. Of these varieties H.312 appears to be the best yielder although its cover is rather poor and it is a medium arrower.

A plant yield-observation trial of "H" varieties growing on good soil was also harvested and H.360, H.364 and H.367, all of Badila x Q.27 parentage, were selected as worthy of further planting. H.360, in spite of lodging, gave a very high early sugar content, whilst at harvest the c.c.s. was several units higher than that of the Badila standard. Of the two "H" varieties planted in propagation at Babinda during 1949 neither showed sufficient promise to warrant further trials. H.411 had better vigour than H.404, but it lodged and its sugar content was lower than that of the two standards in the plot. In the Mackay yield-observation trial of "H" seedlings the standard Q.50 gave a much better performance than any of the seedlings. H.130, H.143, and H.185 gave a higher early sugar content than Q.50, but at harvest their yield was much inferior. At Bundaberg two yield-observation trials of "H" seedlings were harvested, one plant and the other first ratoon. In both trials many of the "H" seedlings outyielded the standard. The varieties H.4, H.6, H.19, H.20, H.25, H.42, H.45, H.46, H.62, and H.64, were selected for further trials. Fourteen Bundaberg "H" varieties were also planted in isolation at Maryborough with a view to trying them out in that district.

The randomised trial of "G" seedlings at Meringa produced a good crop with the variety G.273 giving the best yield. This variety has also shown much promise in a number of propagation trials and it will now be planted on an extended scale. The early maturing G.262 and G.323 are not so promising, the former lodging, whilst the latter is hard and does not weigh well. G.362 is a promising type but its sugar content is lower than that of the others. It is, however, a very useful parent cane. G.208 is a Q.27 x Badila seedling which is being propagated on richer soil types; it is a thick variety which stands up well, is reasonably soft and has good cover.

G.331 is still under observation for better soil types, whilst it is also being used as a male parent. Of the "G" varieties introduced into the Burdekin district, G.208, G.237, G.273, G.323, and G.324, appeared to be the most promising in the first year's planting. In the randomised trial at Mackay G.105 outyielded all other varieties, whilst G.112, G.176 and G.101 also gave good returns in terms of sugar per acre.

Although a first ratoon randomised trial of "F" seedlings was harvested at Meringa it was decided at an earlier date to discard all the "F" varieties included in it since they did not give yields in the plant crop comparable with that of the standard. In Mackay none of the "F" seedlings in the ratoon randomised trial gave as high a yield as Q.50. However, F.124, F.135 and F.186 were planted out in a further randomised trial on a farm in that area. Two varieties, F.30 and F.55, were selected from the ratoon randomised trial of "F" seedlings at Bundaberg. These canes will probably be discarded, since F.30 appears to be susceptible to red rot, whilst F.55 is susceptible to red stripe. At Maryborough F.14, F.18, F.25, and F.60, are still under trial and these same four varieties are also represented in the Beerwah Isolation Plot.

In far northern areas all "E" varieties have now been discarded. E.269 and E.275 were planted in a varietal trial in the Burdekin district during 1950. At Mackay, although the "E" series seedlings in a plant randomised trial did not give a yield equal to that of the standard Q.50, E.129 was planted in a further randomised trial during 1950.

Of the "D" seedlings only D.73 still remains and it is being tried in the Maryborough-Bauple area. Three "B" seedlings are also not yet discarded—B.50, which like D.73, is in the Maryborough-Bauple district, B.174, which is being propagated as an early maturer at Mackay and has recently been allotted a "Q" number as Q.56, and B.331, which is still in trials in the Burdekin district.

VARIETAL STATISTICS

Considerable changes are again shown in the composition of the varieties represented in the 1950 crop. Table IX. shows the varietal composition and the distribution of varieties in the four main districts of the State and in the whole State during the 1950 season. The 1950 crop exceeded that of 1949 by more than 173,000 tons, the increase north of Townsville being slightly more than 200,000 tons, whilst that of Bundaberg and south approximated 90,000 tons. The crushing of the Mackay district, on the other hand, was 113,000 tons lighter than that of 1949, whilst that of Giru and Burdekin was some 5,000 tons lighter. Actually at Mackay the greatly reduced tonnage was due to difficulties of harvest associated with weather conditions at the latter end of the year and an estimated 317,000 tons of cane was allowed to stand over till the following season.

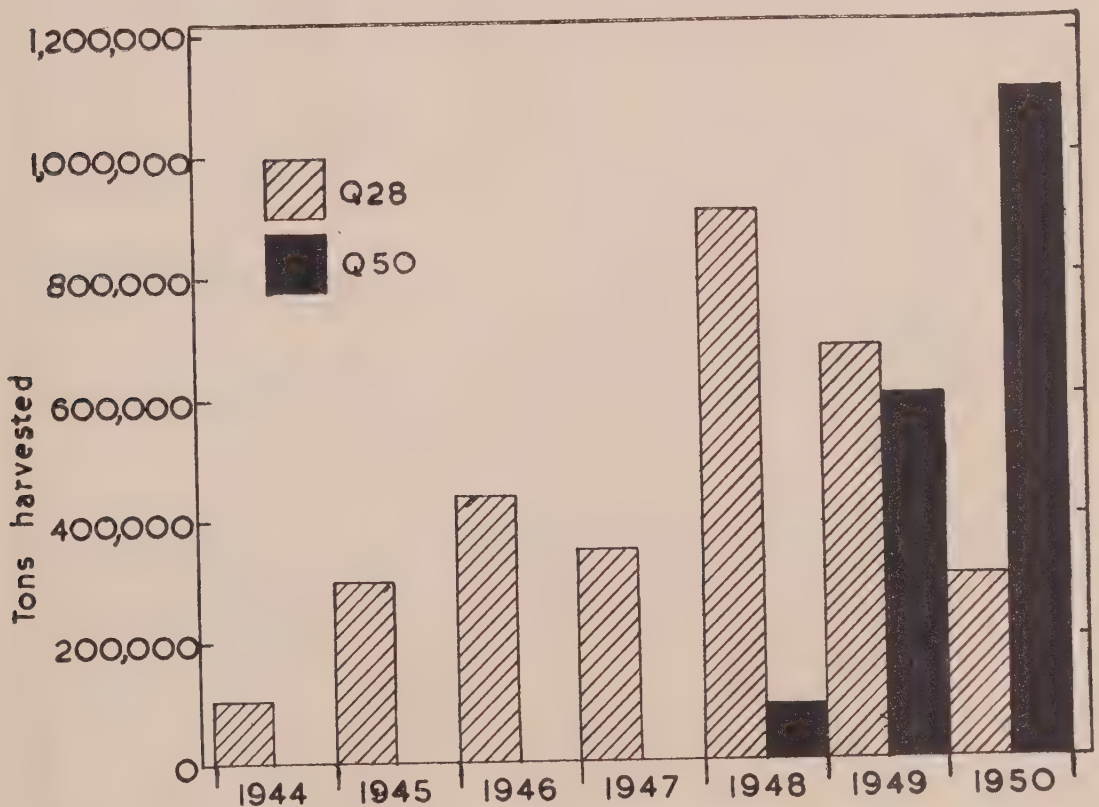


Fig. 5

Illustrating the rapid rise in tonnage crushed of the variety Q.50 in the past three seasons. Note how Q.28 reached a peak in 1948 and has receded.

Again the most meteoric rise was in the tonnage of Q.50 crushed, which rose from 600,000 tons in 1949 to the high figure of 1,100,000 tons in 1950. The histogram in Figure 5 indicates just how rapid was the rise in popularity of Q.50 during the three years, 1948 to 1950. Its first appearance on the crushing list was in 1947 when a tonnage of 567 tons was milled.

Trojan still maintained its position as the leading variety of the State and showed an increase to 20.7 per cent. of the total crop. Q.50 displaced Badila for second place with 16.9 per cent. and if all the cane grown in the Mackay district during 1950 had been crushed it undoubtedly would have challenged Trojan for first place. Actually Q.50 provided 64.4 per cent. of the Mackay district crop. Badila just passed the million ton mark and it was the first time that more than a million tons of each of three varieties was crushed in one year. Although over 100,000 tons more C.P.29-116 was crushed than in 1949, that variety was displaced from third to fourth position on the list, while Q.28 followed its downward path and fell from 10.4 per cent. of the 1949 crop to 4.5 per cent. of the 1950 harvest. In fact, in its stronghold, Mackay, this variety produced only 13.8 per cent. of the district crop compared with 52 per cent. produced by it in 1948. Pindar reached sixth position in the State with 3.9 per cent. of the crop and made a big rise from 14th position in the previous year. This variety will be challenging the leaders by 1952. Comus remained relatively stationary, but Q.44 showed a

decline and would appear to be on its way out. P.O.J.2878 has also fallen from favour and now represents only 3 per cent. of the crop, the tonnage having fallen in all districts. Q.49 maintained its position, but the amount of Q.47 grown was almost doubled and has now passed the 100,000 ton mark. The position of Eros, H.Q.426, M.1900 Seedling, S.J.4, and S.J.16, altered very little, although there was a slight decline in tonnage of each of them. On the other hand, E.K. 28 dropped from tenth place to fifteenth, whilst Co.290 from thirteenth declined to eighteenth. Of the lesser varieties, Atlas, D.1135, Orion P.O.J.2714, and P.O.J.2725, slipped further down the tonnage scale whilst Akbar, Q.51 and Vesta showed appreciable increases. Both Oramboo and Q.2 were removed from the listed varieties and with the passing out of the former one more of the old varieties, which has been grown for almost forty years, has practically disappeared from commercial cultivation.

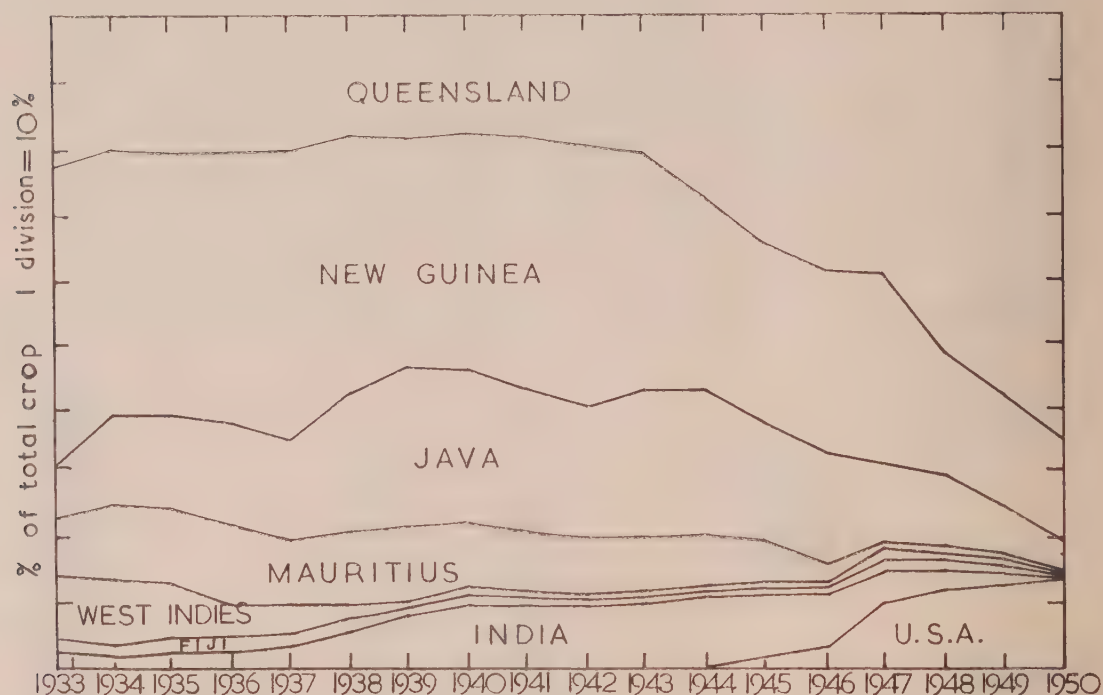


Fig. 6
Showing the cane position of the crop on the basis of country of origin from 1933 to 1950.

In Table VII. and the accompanying graph (Fig. 6) is shown the composition of the 1950 crop on the basis of country of origin. The principal difference between these figures and those presented for 1949 lies in the increase to the extent of some five per cent. in the varieties of Queensland origin. This is principally made up by increases in the amount of Q.50 and Trojan, as these two varieties together now constitute more than one-third of the total State crop. The increase in Queensland-bred canes has occurred at the expense of all introduced varieties with the exception of those from the West Indies which, however, have little bearing on the figures since they represent only a fractional percentage of the total. Badila, now the sole New Guinea representative on the variety list, dropped by 1.2 per cent.

The further extension of Q.50, particularly in the Southern districts and in the far North, and the rapid propagation of Pindar should ensure that the steady increase in the proportion of Queensland varieties, which has continued unchecked since 1940, will be maintained.

TABLE VII.
COMPOSITION OF 1950 CROP ON BASIS OF COUNTRIES OF ORIGIN.

County of Origin	Tons Harvested	% of Crop
Queensland	4,293,423	64.2
New Guinea	1,052,969	15.7
United States	916,175	13.7
Java	292,348	4.4
India	55,574	.8
Mauritius	54,698	.8
Fiji	14,177	.2
West Indies	12,342	.2
	6,691,706	100.0

NEW GUINEA EXPEDITION

From mid-April to early June several weeks were spent in the Territory of New Guinea collecting new varieties of sugar cane. The object of the expedition was twofold. Firstly, noble types of cane were sought which might be of value for direct commercial production as Badila

has been in the past. Secondly, both noble and varieties of other species of use as breeding material were collected with a view to selecting parents with better combining characteristics than many of those at present in use. The accent at present is on early maturity and any of the imported canes which may give early maturing progeny will be used extensively in the future crossing programme. One hundred and sixty-five varieties were collected and these are being grown in quarantine near Brisbane for a period of at least twelve months in order to ensure that no diseases will be introduced to the Queensland sugar industry. In addition, the utmost precautions were taken to prevent insect pests being introduced with the planting material.

TABLE VIII.—LIST OF CROSSES MADE DURING 1951 SEASON.

Cato ..	..	x G.362.
Co.270 ..	..	x Black Innis, Comus, E.281, Eros, G.270, G.323, G.331, Korpi, P.O.J.2878, Q.34.
Co.281 ..	..	x Comus, C.P.29-116, G.331, P.O.J.2878, Q.1098.
Co.290 ..	..	x Comus, G.331, P.O.J.2878, Trojan.
Co.301 ..	..	x Eros, P.O.J.2878.
C.P.29-320 ..	..	x Comus, Eros, G.331.
C.P.34-120 ..	..	x Black Innis, Comus, Eros, G.331, P.O.J.2878.
C.P.36-13 ..	..	x Black Innis, Comus, D.1135, Eros, G.331, P.O.J.2878.
C.P.36-105 ..	..	x Eros, P.O.J.2878.
D.209 ..	..	x Black Innis, Co.281, Co.290, Comus, Eros, G.270, G.331, G.362, I.221, K.5, K.690, K.737, Korpi, P.O.J.2878, Q.34, Q.1098, Trojan.
Eros ..	..	x Co.301, C.P.36-105, G.331, P.O.J.2878, Trojan.
G.263 ..	..	x Co.281, Co.290, Comus, C.P.36-105, Eros, G.253, G.331, P.O.J.2878, Trojan, Uba Marot.
G.323 ..	..	x Trojan.
G.324 ..	..	x G.362, I.221, K.690, K.737, P.O.J.2878, Trojan.
G.326 ..	..	x Co.290, Comus, G.253, G.270, G.331, G.362, I.221, K.690, K.737, Trojan.
G.331 ..	..	x Co.281, Co.290, Eros.
G.362 ..	..	x K.5, Korpi, P.O.J.2878, Trojan.
H.231 ..	..	x Co.290, C.P.36-105, Eros, G.270, G.331, I.221, K.690, K.737, Trojan.
H.312 ..	..	x Trojan.
H.364 ..	..	x G.270.
J.333 ..	..	x Comus, G.331, K.690, K.737.
J.334 ..	..	x Comus, Eros, G.331.
J.337 ..	..	x G.362.
K.5 ..	..	x G.362, Korpi.
Korpi ..	..	x G.270, G.362, K.5, Trojan.
N.Co.310 ..	..	x Comus, C.P.29-116, Eros, G.331, P.O.J.2878.
Pindar ..	..	x G.270, G.331, Q.1098, Uba Marot.
P.O.J.2725 ..	..	x Black Innis, Co.281, Co.290, Co.301, Comus, C.P.29-116, Eros, G.270, G.331, I.221, P.O.J.2878, Q.36.
P.O.J.2875 ..	..	x Co.281, Co.290, Co.301, Comus, Eros, G.270, G.331, I.221, Q.36, Q.1098, Trojan.
P.O.J.2878 ..	..	x Co.281, Co.290, Co.301, C.P.29-116, C.P.36-105, Eros, G.270, G.362, Q.36, Q.1098, Trojan.
P.O.J.2883 ..	..	x Co.281, Co.290, Co.301, Comus, C.P.29-116, C.P.36-105, Eros, G.331, P.O.J.2878.
Q.13 ..	..	x G.270, G.362.
Q.42 ..	..	x E.281, K.690, K.737, P.O.J.2878, Trojan.
Q.44 ..	..	x G.362, K.690, K.737.
Q.47 ..	..	x Comus, G.331, I.221, K.690, K.737.
Q.50 ..	..	x C.P.29-116, Eros, P.O.J.2878, Q.36.
Trojan ..	..	x Co.290, Comus, E.281, Eros, G.270, G.323, G.331, G.362, Korpi, P.O.J.2878, Q.34, Q.36.
31-2484 ..	..	x Co.301, C.P.29-116, Eros, P.O.J.2878.

TABLE IX.—VARIETAL COMPOSITION AND DISTRIBUTION IN THE FOUR MAIN DISTRICTS AND IN THE STATE AS A WHOLE: 1950 CROP.

Varieties	North of Townsville		Burdekin and Giru		Proserpine and Mackay		Bundaberg and South		Whole State	
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%
1. Trojan	1,084,019	40.3	236,053	28.8	53,249	3.2	9,742	.7	1,383,063	20.7
2. Q.50	8,380	.3	0	.0	1,092,748	64.4	8,941	.6	1,110,069	16.7
3. Badila	774,642	28.8	267,406	32.7	10,761	.6	0	.0	1,052,809	15.7
4. C.P.29/116	0	.0	0	.0	0	.0	916,175	61.5	916,175	13.7
5. Q.28	0	.0	4,305	.5	233,480	13.8	59,641	4.0	297,426	4.5
6. Pindar	245,152	.0	12,699	1.6	97	.0	331	.0	258,279	3.9
7. Cornus	68,010	2.5	75,790	9.3	59,505	3.5	0	.0	203,305	3.0
8. P.O.J.2878	3,805	.2	3,093	.4	69,846	4.1	122,226	8.2	198,970	3.0
9. Q.49	0	.0	0	.0	0	.0	166,999	11.2	166,999	2.5
10. Q.44	159,299	5.9	51	.0	0	.0	178	.0	159,528	2.4
11. Eros	135,483	5.1	178	.0	0	.0	0	.0	135,661	2.0
12. S.J.16	0	.0	128,264	15.7	0	.0	0	.0	128,264	1.9
13. H.Q.426	0	.0	11,969	1.5	12,311	.7	0	.0	109,665	1.6
14. Q.47	85,385	3.2	0	.0	0	.0	109,320	7.3	109,320	1.6
15. E.K.28	0	.0	48,513	5.9	36,245	2.1	0	.0	84,758	1.3
16. M.1900	0	.0	0	.0	50,061	3.0	4,637	.3	54,698	.8
17. Cato	54,675	2.1	0	.0	0	.0	0	.0	54,675	.8
18. Co.290	0	.0	0	.0	25,942	1.5	24,252	1.6	50,194	.8
19. S.J.4	37,230	1.4	3,229	.4	0	.0	0	.0	40,459	.6
20. Q.45	0	.0	0	.0	40,212	2.4	0	.0	40,212	.6
21. Q.42	0	.0	0	.0	0	.0	31,734	2.1	31,734	.5
22. S.J.2	40	.0	14,532	1.7	3,117	.2	0	.0	17,689	.3
23. Pompey	14,177	.5	0	.0	0	.0	0	.0	14,177	.2
24. Vesta	0	.0	0	.0	0	.0	12,335	.8	12,335	.2
25. B.208	0	.0	11,690	1.4	0	.0	0	.0	11,690	.2
26. Q.25	0	.0	0	.0	0	.0	8,245	.6	8,245	.1
27. Orion	7,696	.3	0	.0	0	.0	0	.0	7,696	.1
28. P.O.J.2725	524	.0	0	.0	5,849	.3	335	.0	6,708	.1
29. Co.301	0	.0	0	.0	0	.0	5,380	.4	5,380	.1
30. Q.813	0	.0	0	.0	1,257	.1	1,081	.1	2,338	.0
31. Q.48	0	.0	0	.0	0	.0	2,220	.2	2,220	.0
32. Akbar	0	.0	0	.0	0	.0	2,128	.1	2,128	.0
33. P.O.J.2714	0	.0	775	.1	472	.0	0	.0	1,347	.0
34. Q.51	0	.0	0	.0	0	.0	1,229	.1	1,229	.0
35. Q.10	1,095	.0	0	.0	0	.0	0	.0	1,095	.0
36. P.O.J.213	0	.0	0	.0	0	.0	665	.1	665	.0
37. B.147	341	.0	0	.0	0	.0	0	.0	341	.0
38. D.1135	143	.0	0	.0	168	.0	0	.0	311	.0
39. H.Q.409	288	.0	0	.0	0	.0	0	.0	288	.0
40. Atlas	0	.0	0	.0	0	.0	224	.0	224	.0
41. Others	6,734	.3	77	.0	1,353	.1	1,273	.1	9,437	.1
Totals	2,687,118	40.16	818,624	12.23	1,696,673	25.35	1,489,291	22.26	6,691,706	100.00

Division of Entomology and Pathology

By R. W. MUNGOMERY

GENERAL

The season under review can only be described as highly abnormal. It was characterised by extremely heavy rainfall in the early summer period and by extremely dry conditions which followed the early and abrupt termination of the wet season. Weather of this type could only be expected to have exercised a profound influence on the incidence of pests and diseases. In addition, it increased the severity of the resulting damage and placed almost insuperable difficulties in the way of those growers who wished to institute appropriate control measures.

White grub damage and yellow spot disease tended again to dominate the picture by their spectacular effects on many of the northern crops during the early months of this year. Whilst failure to control grubs adequately in 1951 may be attributed largely to the general shortage of labour and to the interruptions caused by the abnormal wet weather during the spring-summer period of 1950, it is nevertheless felt that in many instances the application of benzene hexachloride was not accorded a priority in farming operations in keeping with its importance in ensuring the final well-being of the crop. In other instances a number of growers continued to take undue and expensive risks by not availing themselves of the protection afforded by B.H.C., and it seems inevitable that many growers must continue to suffer losses individually before they can be induced to adopt control measures against this pest and thereby reduce grub damage to negligible proportions.

In so far as yellow spot disease is concerned it is evident that the causal organism is so widespread and susceptible varieties are so extensively planted in North Queensland that a flare up of the disease is now likely in the wetter sections of the State each year so long as the present varietal position is maintained. Moreover the earlier and more prolonged the wet season the greater will be the severity of the attack.

A rather disturbing finding during the past year was the widespread occurrence of chlorotic streak disease in the Maryborough mill area. However, surveys have revealed that a good deal of the cane on the higher land is apparently disease-free, and an energetic campaign has now been set in motion there against this new threat. Chlorotic streak still remains a major disease throughout the areas north of Townsville and the position there is further complicated by extensive leaf-scald infection. A number of northern Boards have been alerted regarding the losses accruing from these two diseases, and as a result it is expected that measures of a more positive nature will be adopted to restrict their spread.

On the credit side the continued absence of both gumming and downy mildew diseases from commercial crops in Queensland and the low level to which Fiji disease has been reduced have been grounds for considerable satisfaction.

CONFERENCE OF CANE PEST AND DISEASE CONTROL BOARDS

The thirteenth conference of Cane Pest and Disease Control Boards was held in Ingham on 17th May, 1951, when 39 delegates representing seventeen Boards were in attendance. Matters discussed included such subjects as the inadvisability of mixing benzene hexachloride with fertilizer for cane grub control, control of third stage "frenchi" grubs by means of B.H.C., varietal susceptibility to yellow spot disease, etc., all of which are referred to in greater detail elsewhere in this report. On the following day delegates were taken on a tour of the Herbert River canefields when they were afforded an opportunity to become acquainted with local agricultural conditions generally, and in particular with a number of pests and diseases occurring in that area. A departure from past practice was the decision to hold next year's conference at Bundaberg, which, it is hoped, will facilitate the attendance of a greater number of representatives from southern Boards.

THE GREYBACK GRUB PEST *Dermolepida albohirtum* Waterh.

Beetle emergence took place as early as September and October in some of the wet red soil areas, but it was not until mid-November that the general emergence of beetles occurred. The continuous rains throughout the November-December period allowed beetles to emerge as soon as they were ready after transformation to the adult stage; hence beetle flights were not so distinct as in former years. Nevertheless, the conditions that favoured this protracted emergence also favoured oviposition and hatching, and extensive infestation resulted in many mill areas throughout North Queensland. Generally the intensity of the infestation was high except in certain compact areas which had been consistently treated with B.H.C. over the last few years, and there beetle emergence and oviposition was apparently on a greatly reduced scale. Elsewhere the uncontrolled infestations of the previous year maintained the pest at a dense population level, and in many instances beetles migrated and oviposited in fields which hitherto had been regarded as being subject only to minor damage. Hence damage was maintained at the same high peak which characterised this pest's activities during the two previous years.

Damage was most concentrated in the areas from Tully to Mossman, where it was estimated that more than 77,000 tons of cane were lost from over 18,000 acres. The remainder of the affected fields extended as far south as Mackay, and brought the overall losses up to approximately 95,000 tons of cane from 22,500 acres. These figures indicate the need for greater attention being paid to protecting vulnerable areas, and losses would have assumed staggering

proportions had not B.H.C. been applied to an additional 37,000 acres of grub-infested canelands, comprising 24,000 acres of plant cane and 13,000 acres of ratoons.

It might have been expected that growers generally would have taken steps to avert the disastrous losses of former years. Many did, but others who had been unaccustomed to infestations of this magnitude were caught with their fields untreated and consequently they in turn suffered serious losses this season. Probably the most important factor militating against the successful protection of fields with B.H.C. was the unseasonable rains which fell throughout the harvesting period. These rains so disrupted farm routine that instead of applying B.H.C. to the young crops and getting the insecticide properly incorporated with the soil around the base of the stools, growers had to defer this important control work until late in the year. Because of the advanced growth of the crops at that time and the sodden nature of the soil, implements could not be utilised for the distribution of the B.H.C. dust and a good deal was applied by hand. Most of this remained on the surface where, under the subsequent dry conditions, it proved quite useless. Obviously control measures against such an important pest should take precedence over many other farm operations, for it is futile to fertilize, cultivate and control weeds if the crop is ultimately to be completely destroyed by grubs. The more recent use of 2,4-D as a pre-emergence spray for the suppression of weeds has not complicated the application of B.H.C. for grub control, and growers can still select the most opportune time for applying the insecticide, filling in the drill and making a further spraying with 2,4-D if considered necessary.

Experiments on the Control of Greyback Grubs

Field trials using B.H.C. and other insecticides for greyback grub control which were initiated or continued during the year included the following:—

Split Dressings versus Single Application of B.H.C.

First ratoons of these trials planted in 1948 were harvested in 1950 and they demonstrated that no advantage was to be gained by treating the plant and first ratoon crops separately when compared with a treatment involving the same total quantity of B.H.C. applied as a single dressing to the plant crop.

Circumstances prevented the weighing of the second ratoon crop of a similar trial on red volcanic soil, but observations on the growth of the cane in the various plots indicated that the single plant crop treatment gave the best results.

These results tie in closely with the necessity for applying heavy dressings of B.H.C. on plant cane for the control of young "frenchi" grubs where both species occur together. Furthermore, the greater economy and simplicity of a single dressing have been important considerations in our recommendations to use the single dressing in preference to re-treatments which involve added difficulty in getting the dust satisfactorily buried in the shallow ratooning furrow, especially on the red soils. In view of the fact that the practice of re-treating ratoon fields has persisted in some areas ever since B.H.C. some years ago was not in sufficient supply for the full treatment of plant crops, confirmatory trials of a simplified type were set out in the Johnstone district to demonstrate the advantages in favour of applying a single adequate dressing to the plant crop.

Experiments Involving Various Concentrations of B.H.C. Dust for Grub Control

In 1950, plant crops were harvested from trials in which equivalent amounts of 20 per cent. and 10 per cent B.H.C. dusts were used for grub control; no significant difference in efficacy between the two types of dust was revealed from the plot weights. Observations to date on the growth of the first ratoon crops give precisely the same indications. Similar trials were set out last year with 50 per cent. and 20 per cent dusts, but no differences have so far been observed.

B.H.C. Placement Trials

A B.H.C. placement trial, which was set out in 1948, was too lightly infested with grubs in 1949 to give significant differences between treatments, but the following ratoon crop was heavily infested and results from this trial were highly significant. The two main positions for the placement of the B.H.C. were (1) in the bottom of the drill below the setts, and (2) in the drill immediately above the setts. In both instances a thin layer of soil separated the B.H.C. from actual contact with the setts, thereby circumventing any severe stunting of the roots in the early stages of the establishment of the plants. The treatment rates ranged from 50 to 200 lb. of 10 per cent. B.H.C. per acre and the mean yields were as follows:—

Placement above the setts	29.3 tons per acre.
Placement below the setts	23.7 tons per acre.

The difference in favour of the shallower treatment was consistently present at all treatment rates, and the actual yields were in close agreement with the observed gradations of grub damage, thereby indicating that the yield differences were closely linked with the degree of grub control achieved. These results indicated that B.H.C. can be placed too deep for the effective control of greyback grubs. Previous investigations showed surface dressings to be quite unsatisfactory, and it is evident that for optimum control, the B.H.C. should be placed approximately two to three inches below the ultimate soil level of the field. These findings influenced the choice of B.H.C. placements in subsequent experiments



Fig. 7

Illustrating the defoliation of a weeping fig tree at Highleigh in December, 1950, caused by the feeding of beetles during the very heavy flights.



Fig. 8

The same tree in February, 1951, after regrowth.

against the "frenchi" grub, since the frequent co-existence of both greyback and "frenchi" grubs in certain canefields requires that for reasons of economy, the method of control for one should, if possible, be equally satisfactory for the other.

B.H.C.-Fertilizer Mixtures versus Standard Half-Open Drill Method of B.H.C. Application

Large field scale experiments were set out to test the efficacy of a B.H.C.-fertilizer mixture applied at planting time in comparison with the standard practice of fertilizing at planting time and applying the B.H.C. later in the half-open drill after the cane has germinated and stooled adequately. Progressive observations on the growing plant crops showed that in fields where there is an obvious fertilizer response there was a considerable loss in yield when the B.H.C. and fertilizer were mixed.

In the experiments the equivalent of 75 lb. of 20 per cent. B.H.C. (2.6 gamma isomer) per acre was used, and the degree of grub control achieved was equally satisfactory with both methods of application. However, the depression of yield by the mixture was parallel to the magnitude of the normal fertilizer response and disappeared when there was no benefit from fertilizer.

In one of these trials in which greyback grubs only were involved the following mean yields were obtained:—

Treatments	Mean yields tons per acre
4 cwt. fertilizer per acre in drill at planting time 75 lb. 20% B.H.C. per acre applied later in half-open drill }	21.0
75 lb. 20% B.H.C. and 4 cwt. fertilizer per acre mixed and applied in drill at time of planting	13.4
No fertilizer; 75 lb. 20% B.H.C. applied in half open drill	7.8
Necessary difference for significance—at 5% level	= 4.7
at 1% level	= 6.4

In an attempt to economise on a number of different farm operations a few growers mixed their fertilizer with B.H.C. at rates varying from 80 to 100 lb. of 20 per cent. dust per acre, and applied the mixture in the drill at planting time. The setts were placed directly on top of the mixture, but unfortunately this procedure was followed by germination failures. A trial to determine whether this unusual placement of the B.H.C. was directly responsible for these failures was set out on the Meringa Sugar Experiment Station, and three varieties, namely Badila, Trojan and Pindar, were included in the plantings. All varieties reacted in precisely the same manner and this experiment showed that a much delayed and greatly reduced germination resulted from placing the plants directly on top of the B.H.C. whether mixed with fertilizer or not. No adverse effect resulted when 20 per cent. B.H.C. was placed at the rate of 100 lb. per acre above the setts but separated from actual contact by a thin layer of soil.

Trials with Miscellaneous Insecticides

Results obtained with chlordane in 1950 indicated that dressings at rates of 1 lb. and 5 lb. per acre gave apparently good control of greyback grubs in first ratoon cane where the insecticide had been applied to the previous crop. However, results from the first ratoon crops of other trials during the current year point to the possibility of some associated factor having influenced the yields, since they are much inferior to those where B.H.C. was used as a standard of comparison.

Tests with Dieldrin at rates of 1, 2, and 4 lb. per acre point to this chemical having given grub control approximating that secured from the standard B.H.C. treatment. However, results so far obtained have been from plant crops only, and the residual protection will be evaluated in the following ratoon crops.

Similarly, in regard to E.605, the residual effect is not known, but since treatment rates at 2 lb. and 4 lb. per acre failed to reach the standard of control set by the normal B.H.C. treatment, it is unlikely that this insecticide will be able to compete on a cost basis with B.H.C. for cane grub control.

THE "FRENCHI" GRUB PEST *Lepidiota frenchi* Blkb.

Damage from this pest was confined mainly to certain restricted areas between the southern portion of the Mulgrave district and Mossman. A lesser amount of damage was recorded from the Mackay district. In all, approximately 1,400 acres were affected with a loss of 5,300 tons. A very heavy beetle emergence was recorded at Mt. Sophia in mid-November, 1950, and it is likely that damage will be severe in that section during the summer of 1951.

Experiments with B.H.C. against Third Stage "Frenchi" Grubs

It was disclosed in a previous annual report that the "frenchi" pest could readily be controlled with B.H.C. if the grubs made contact with the insecticide in their first or second instars, and it is probably not without significance that no appreciable "frenchi" damage has occurred in fields where 20 per cent B.H.C. has been applied in the half-open drill at the rate of 75 lb. per acre for the control of greyback grubs.

The unsolved problem at the commencement of the past year was the control of third stage "frenchi" grubs which are frequently in evidence when fields are ploughed out and re-planted immediately afterwards. It is recognised that this practice is not only undesirable

from an agronomic viewpoint, but it also encourages the building up of grub populations. However, insofar that immediate replanting sometimes becomes a necessary expedient, investigations were carried out to determine whether third stage "frenchi" grubs could readily be controlled under such conditions.

The treatment found most successful consisted in applying 75 lb. of 20 per cent. B.H.C. per acre in the drill at planting time just above the setts which were first protected against root damage by filling in soil level with or slightly above their top surface. The B.H.C. was applied in a band nine inches wide on this protecting soil, and the normal two or three inches of cover was allowed to flow in above the B.H.C. Placed in this position the B.H.C. was also able to control greyback grubs successfully, a fact which greatly enhances the economic status of the method where both species are likely to occur together.

Experiments with Other Insecticides

A number of emulsified insecticides, namely, B.H.C., E.605, Dieldrin, and Chlordane, were applied on the surface of the soil in aqueous suspension in an attempt to control third stage "frenchi" grubs, but the results, were not encouraging.

MISCELLANEOUS WHITE GRUBS

There was a general build up in grub populations in both the Bundaberg and Isis districts with reported damage centred mainly in the Kepnock, Oakwood, Gooburrum, Bingera and South Isis areas. Second stage grubs of *Lepidiota trichosterna* Lea were active as early as the first week of July, 1950, and the severity of their subsequent attack was no doubt lessened by the good growing conditions of the 1950 spring-summer period.

In the Bundaberg area 10 acres of grub-infested fields were fumigated with carbon bisulphide, but in the Isis area no attempts were made to control *Pseudoholophylla furfuracea* Burm. by means of soil fumigation. Experiments with B.H.C. dusts were continued but no conclusive results were forthcoming from the different treatments involving various amounts and methods of placement. B.H.C. emulsions gave disappointingly poor results against active populations of *L. trichosterna* and this type of formulation will not be tested further against this pest.

In the Proserpine district the black beetle, *Metanastes vulgivagus* Olliff, caused some trouble by destroying germinating setts, but its attacks were localised and not sufficiently sustained to warrant experiments in control being continued.

BORER PESTS

Increased activity by the moth borer became evident in young crops of both plant and ratoon cane during the late winter period of 1950. In fact, damage was so widespread that checks were made on the identity of the borer responsible, in view of the possibility that an immigrant species might have become established. However, specimens examined and bred out for identification revealed that only the native species, *Phragmatiphila truncata* Walk, was involved. Its sudden increase was attributed to a temporary upset in the parasite complex, caused by continuous rains.

For the most part infestation was concentrated within a chain of headlands, but a light general distribution of damaged shoots occurred throughout a number of fields. All of the more important varieties in the northern areas were affected and damage was most severe in the Babinda and Mulgrave districts. In the Mackay district damage was on a reduced scale.

The weevil borer, *Rhabdoscelus obscurus* Boisd. was seldom in evidence, its depressed status being due solely to the system of pre-harvest burning which has generally been adopted here ever since the war years.

WIREWORMS

No reports of wireworm damage were received, and it is apparent that growers have taken full advantage of the control offered in the B.H.C.-fertilizer mixtures which are applied at planting time. It is estimated that over 21,000 acres were protected in this manner.

MINOR INSECT PESTS

During the late summer months infestations of the sugar cane scale, *Aulacaspis madiunensis* Zehnt., were seen in standover blocks of Q.47, Q.50 and P.O.J.2878 in the Millaquin, Qunaba, and Bingera mill areas of the Bundaberg district. The incidence of scale in blocks of Q.50, which were left for planting material, was widespread, and it is evident that this variety allows considerable colonisation. In the Mackay district the scale was similarly observed on standover Q.50.

Infested stalks were forwarded to the disease plot at Moggill, near Brisbane, where colonies are being built up on the variety P.O.J.213 prior to establishing trials with some of the newer varieties to determine to what extent they are liable to attack in standover crops.

The crater nest ant, *Aphaenogaster phythia* Forel, continued its activity in canefields near Tully where it caused some concern by loosening and drying out the soil around the base of the cane stools. There is some indication that fairly heavy applications of B.H.C. in the drill give a considerable measure of control, but the matter of its placement requires further investigation.

The mole cricket, *Gryllotalpa africana*, was responsible for localised damage to germinating setts in one of the sub-districts of Mackay and some supplying was necessary, but the attack was not sufficiently sustained to justify control experiments being initiated.

ANIMAL PESTS

Rat damage was generally light and widespread throughout most of the northern mill areas. However, in specially favoured environments it was more severe, and a localised outbreak of this type was noticed as far south as Beenleigh, where cane adjacent to the river suffered extensively. Standover crops in the central areas fortunately did not complicate the rat problem there.

For the most part populations appeared to show a slight increase over those of the previous year, but the early termination of the wet season and the subsequent dry weather did not favour any further upward tendency. Vigorous baiting campaigns were maintained, particularly in view of the high incidence of Weil's disease during the wet periods of 1950.

Wallabies gave some trouble in the central district, but mostly their attacks were restricted to areas where the canelands adjoined timbered country or to isolated farms.

Wild pigs were destructive again mainly in the Babinda, Hambledon and Mossman areas where a bonus payment of £1 a head has aided in keeping them in check.

Damage by foxes was reported from some of the more remote areas in south Queensland, and the consistent attention given by these animals to blocks of Q.50 indicates a decided preference for this variety. Hitherto the variety H.Q.285 used to be singled out for attack, but this cane has so declined in popularity because of its inferior yields that very little is now being grown.

Flocks of cockatoos proved troublesome in the Carmila area and their attacks no doubt were a direct result of migrations from the central and western areas consequent on the dry autumn of 1951 following closely in the wake of the lush growing conditions throughout 1950.

RATOON STUNTING DISEASE

The very wet spring and summer followed by a dry autumn and winter made ratoon stunting disease somewhat difficult to detect in the Mackay district during the past year. In previous years it had been observed that the disease is most pronounced after a dry spring and early summer; that is, when conditions are dry during the early growth of the young ratoons. However, if there is ample moisture available at this stage of growth the stunting is not nearly so severe.

In spite of this difficulty in detecting the disease there is little doubt that it has decreased considerably. This has been due mainly to the replacement of Q.28 by the more resistant Q.50 on many farms where the disease has occurred, and to the selection of healthy planting material where Q.28 is still grown. The rapid increase of the variety Q.50 at the expense of Q.28 is illustrated by figures for the 1948 and 1950 crops. In 1948 Q.28 constituted 52.2 per cent. of the Mackay crop, while Q.50 produced only 5.4 per cent. By 1950 Q.28 had fallen to 13.8 per cent., while Q.50 had increased to 64.4 per cent. This sudden varietal change was due mainly to the excellent qualities of Q.50, but the fear of ratoon stunting disease in Q.28 was also an important factor. Ratoon stunting disease has also been recorded throughout the Maryborough and Bauple areas during the year; here again the disease was not obvious until cane growth was checked by the very dry winter.

Results from the experiments laid down in 1949 have in most cases been inconclusive to date, because of the difficulty in detecting the disease this year; all plots will be ratooned again in the spring and it is hoped that more definite results will be obtained from the second ratoon crop. The varietal resistance trial has shown that a number of varieties are susceptible to the disease. Those which showed an obvious reduction in growth as a result of inoculation included Black Cheribon, P.O.J.2725, P.O.J.2878, Q.56, and ten advanced seedlings. A slight reduction in growth occurred in C.P.29/116, Co.290, Co.301, E.K.28, Glagah, N.Co.310, P.O.J.100, P.O.J.213, Pindar, Q.45, Q.50 and Vesta, and four advanced seedlings, while no apparent differences were observed in Badila, Comus, Eros, H.Q.426, Kassoer, Loethers, M.1900S., P.O.J.2364, Q.42, Q.47, Q.1098, S.J.2, Trojan, 28 N.G.253 and four advanced seedlings. Many of the latter group of varieties were poorly grown and it is possible that some of them were diseased before inoculation. The most susceptible of all varieties tested was a seedling, G.176, which showed outstanding difference between the inoculated and control plots; even in the young ratoons where soil moisture was very high the inoculated plots showed considerable wilting. Because of its sensitivity this variety will probably be very useful in future experimental work on the disease.

Hot water treatment of diseased setts as a possible curative measure has again shown promise of success. Treatments up to 54°C. for 1½ hours have given good germinations, and the cane which received this high temperature treatment is apparently healthy at the present time. Further plantings have been made from this treated cane, and observations will also be made on the second ratoon crops.

Healthy Q.28 inoculated with juice from poorly grown crops of other varieties has shown the disease to be present in P.O.J.2878 and Q.813, and probably in several other varieties. However, inoculations with extracts of grasses, plant refuse and soil collected where the disease had occurred have not produced any disease so far. There are also indications that juice from diseased cane does not remain infective for more than a day or two after extraction, and that the infective agent is destroyed by several common disinfectants such as phenyl, carbolic acid, "Dettol", "Lysol" and others; further work is being carried out on these subjects.

Another varietal resistance trial has been planted this year; it includes a number of commercial and breeding varieties which were not included in the previous trial, together with promising seedlings from the Mackay Experiment Station. In addition, juice from a number of inoculated varieties in the previous trial was inoculated into G.176 to determine if these varieties were carrying the disease.

YELLOW SPOT DISEASE

For the second year in succession yellow spot disease, *Cercospora kopkei* Krng., was present in epiphytotic proportions in the northern mill areas of the State. It appeared in an obvious outbreak during late December, i.e., two months or so earlier than in the previous summer. By analogy with a similar disease in bananas it is possible that the outbreak was due to the combination of high temperatures and high humidities during November and further periods of similar weather led to such a build-up of the disease that by March every field of susceptible varieties had become infected. The infection was heavier and more widespread than in the previous year. The monsoonal wet season stopped earlier than usual, but the autumn and early winter were so dry in the North that it was impossible even to hazard a guess as to the losses due to the disease. In any case, the cane stopped growing and the effect of the disease was then only a minor trouble compared with that due to the loss of soil moisture.

In some areas it was noted that late planted or late ratooned cane was not so heavily infected as the more advanced crops, but in the Innisfail district this effect was not noticeable. Heaviest infection occurred in low-lying areas at Mossman, Mulgrave, and Babinda, but infection at Innisfail was, in general, so heavy that there were no differences between the wetter areas and those higher and drier.

Symptoms first became conspicuous in the variety Trojan, which again showed itself to be the most susceptible commercial variety. Shortly afterwards less susceptible varieties showed the disease and from the pathological angle it was fortunate that the disease soon became severe on the Northern Sugar Experiment Station, where a large range of varieties is maintained for the crossing work. This allowed some indication to be obtained of the relative susceptibility of some 37 of the 40 approved commercial canes in Queensland. The limited information from Meringa plus the known field reaction of northern canes has allowed a provisional classification of susceptibility to be drawn up:—

<i>Susceptible</i>	<i>Medium</i>	<i>Resistant</i>	<i>Resistant</i>
Co.281	Comus	Atlas	Orion
Co.301	Eros	B.208	Pindar
H.Q.285	H.Q.426	Badila	P.O.J.213
Q.28	M.1900 S.	Badila Seedling	P.O.J.2725
Q.42	P.O.J.2878	Cato	Pompey
Trojan	Q.25	Co.290	Q.44
	Q.45	C.P.29/116	Q.47
	Q.49	D.1135	Q.813
	Q.50	Mahona	S.J.2.
	S.J.4	Oramboo	S.J.16
			Vesta

The varieties listed under "Susceptible" are generally badly spotted and, in advanced stages of the disease, show a good deal of dead foliage. The "Medium" column includes varieties which show appreciable spotting and may be badly marked but usually do not develop much dead foliage. The placing of Eros in this category is largely based on the development of spotting because as yet it has not been possible to separate the effects of the disease from the normal loss of cover which is such a marked feature of the later crop period of this variety. The resistant varieties vary from Badila, Cato and Q.44, which seldom show any spotting at all, to Pindar which can on occasions almost qualify for the "medium" class. In any classification such as this, however, division into correct categories of reaction is impossible and there is always a certain amount of overlapping.

A perusal of the literature on yellow spot shows that from time to time experiments have been carried out in different countries for the control of the disease, and it was thought that some local information concerning the efficacy of certain fungicides was desirable. It was considered essential to be in possession of such information before undertaking any experiments designed to estimate the losses occurring as a result of this disease. Skirmish spray trials using a wettable sulphur and the copper oxy-chloride preparation, "Cuprox", were initiated in April, but growth ceased before any comparisons could be made in growth between treated and untreated plots. The interesting information that "Cuprox" damages leaves of mature cane was obtained and other tests indicated that Bordeaux was much less toxic. Spraying in large cane is an expensive, arduous task and it is obviously uneconomic unless in particular circumstances.

PINEAPPLE DISEASE

The 1951 planting season saw a general increase in the amount of pineapple disease, *Ceratosomella paradoxa*, in most areas of the State. It is not clear at present just what is the chief reason for the increase but change of variety (as at Mackay where the new popular Q.50 is more susceptible than the Q.28 it has replaced), change in the prevalent strain of the organism and the unusually dry and cold winter may all have had some effect.

The dipping of plants is by no means a general practice in the Bundaberg area, although Fairymead plantation has found it profitable over the last two seasons, but from the experience of the planting season just past it would appear that the local farmers will soon have to give consideration to dipping all plants put in during the colder months of the year. Pineapple disease



Fig. 9

Showing the losses caused by leaf-scald disease. The stalks standing were dead and were left by the cane cutters. Further dead stalks are visible on the ground.



Fig. 10

A circular saw arrangement for cutting cane plants. Note that it is mounted on the same framework as the mercurial dipping plant. This set-up saves considerable time and labour.

caused the failure of a small percentage of fields planted in July, especially in the South Kalkie area and autumn plantings again proved unreliable on the forest lands through infection with the same disease. Failures were likewise reported from the Isis district.

In the central districts of Mackay and Proserpine there were many failures in the autumn and winter plantings of Q.50 and Comus. Many of the farmers thus affected dipped setts in mercurial solution for replanting or for supplying misses, but it is expected that next year will see a good deal of dipping for the main plantings in the cooler months.

In the irrigated Burdekin district where pineapple disease has been a problem for many years, the dipping of plants was even more extensive than in 1950 and it has now become a standard practice on most farms. The most popular dipping unit is mounted on a strong slide, or chassis and wheels, and comprises a tank, mast and boom, capable of dipping a full planter-box load at the one time. The lifting device is often motor powered and a circular saw arrangement is frequently attached to the dipping unit for cutting setts. The recently developed system for spraying the setts with mercurial solution in the chute of the cutter-planter appeals to some growers, but its efficacy is not yet proved. Two dipping trials for the testing of several mercurial preparations have been planted but results are not yet available.

In the far north pineapple disease showed a marked increase in comparison with the previous year and some failures occurred in the Innisfail district where satisfactory strikes are generally the rule.

FII DISEASE

The position with regard to Fiji disease continued to improve and it is felt that the elimination of this disease from the commercial sugar cane crops of the State should not be long delayed. In fact the disease has been brought to such a low ebb that at the present time every effort is being made to get rid of all diseased fields as early in the crop cycle as possible. For the second year in succession Fiji disease was not found at Maryborough and the ploughing out of the diseased block in the Isis area has apparently prevented the spread of the disease there for not a single diseased stool was found in the neighbourhood during last summer. The lack of disease for one or two years does not, of course, mean the disease has disappeared, but it is at least a favourable omen! At Bundaberg and in the Moreton Mill area the number of diseased stools found continued to decrease; 141 were located in the Bundaberg Cane Pest and Disease Control Board's area and at Moreton 189 were found.

Results from the ratoons of two Fiji disease resistance trials came to hand during the year. One trial was at Beenleigh, where trials have been conducted since 1938, and the other at the new plot at Moggill. Both trials were successful and the results from each agreed closely. Following is a summary of the disease recorded in the named varieties in the two trials:

Variety	Total Stools	Diseased Stools	Percentage Diseased Stools	Variety	Total Stools	Diseased Stools	Percentage Diseased Stools
C.P.29/116 ..	94	13	14	Co.301 ..	70	1	1
C.P.29/320 ..	48	0	0	M.1900 S. ..	69	29	42
C.P.34/79 ..	74	2	3	N.Co.310 ..	74	10	13.5
C.P.34/120 ..	73	23	31.5	P.O.J.2878 ..	122	58	47.5
C.P.36/13 ..	72	0	0	Pindar ..	73	0	0
C.P.36/62 ..	39	0	0	Q.50 ..	72	10	14
C.P.36/105 ..	62	1	2	Trojan ..	73	1	1
China China ..	34	5	15	Vesta ..	73	9	12
Co.281 ..	68	3	4	32-8560 ..	67	47	70

In interpreting these results it must be pointed out that it is difficult to control the disease in a variety of the same order of susceptibility as P.O.J.2878, while it can be controlled relatively easily in canes in the C.P.29/116-Vesta bracket. The fact that Q.50 and N.Co.310 come into this category is of interest in view of the promising behaviour of these varieties in South Queensland.

DOWNY MILDEW DISEASE

For the first time since detailed records have been kept not a single stool infected with downy mildew, *Sclerospora sacchari*, has been recorded anywhere in the cane fields of the State. With a bulky crop such as sugar cane grown over extensive areas it would be rash to suppose that the disease has yet been eradicated, but the results of inspections during the next few years will give a definite conclusion. In the meantime and for many years to come downy mildew disease resistance trials will be run for the testing of the new commercial canes. Although the Bundaberg downy mildew plot is well isolated from commercial cane, the possible elimination of the disease from the district makes it imperative to move the trial elsewhere, and it is planned as soon as practicable to transfer future downy mildew resistance trials to the Moggill Pathology Plot.

The trial just completed included a large number of advanced Bureau and Colonial Sugar Refining Company seedlings as well as named varieties. The disease recorded in the varieties is set out below:—

Variety	Number Diseased Stalks/Total	Per cent. Diseased Stalks	Variety	Number Diseased Stalks	Percentage Diseased Stalks
C.P.29/320	0/404	0—	M.134/32	14/272	5—
C.P.34/79	8/254	3—	M.112/34	135/278	48
C.P.36/13	13/343	4—	M.65/38	38/283	13
C.P.36/62	24/226	11	M.63/39	63/278	23
Co.290	27/359	7	P.O.J.2878	163/457	36
Eros	36/285	13	Ragnar	0/374	0—
			Trojan	56/259	22

Any variety showing the same or less susceptibility than Co.290 can be regarded as commercially safe although in the above table the amount of disease shown by Eros is anomalous. Many other trials have led to the conclusion that this variety is more susceptible than Trojan or P.O.J.2878. M.112/34 is apparently quite susceptible, while M.63/39 would probably need active control measures if downy mildew were present.

CHLOROTIC STREAK

Chlorotic streak disease occurred in the known centres of infection in the wetter areas in the far North and at Moreton in the South, but in addition during the past year it sprang into sudden prominence in the Maryborough district. It had been found there in 1947 on one farm but had not been seen again until January of this year when it was located in the variety M.1900S. at Walker's Point. Surveys have shown that the disease is worst on the alluvials of Island Plantations, Walker's Point and Tinana, but it is also present on low, rather poorly drained sites in the coastal Pialba area, and on higher ground at the southern end of the cane lands. Twenty-seven alluvial farms were found infected, the fields in this instance totalling a little over 110 acres actually showing the disease; in addition, 42 acres were involved on 12 farms at Pialba and 23 on seven in the southern part. As usual with this disease infections varied from severe to very light as judged by the amount of streaking present, but it was difficult to estimate the losses in the different varieties: the indications were that some of the heavily infected fields of M.1900S. (not long brought back to the district after the control of Fiji disease) were suffering substantial losses. In addition to M.1900S., C.P.29/116, P.O.J.2878, Q.28, Q.47, Q.49, Q.50, Q.51 and Q.813 showed the disease. Control measures will involve the control of planting material and the prohibition of indefinite ratooning of diseased crops.

Several chlorotic streak yield trials were planted in North Queensland during 1950 but results are not yet to hand; the plant trial at Moreton had to be abandoned owing to unseasonal floods in spring. The first ratoon trial at Moreton in which plots from healthy and diseased Q.47, Q.49 and Vesta were compared did not yield significant differences but it is felt that irregularities in the plot site could have been responsible for the negative results.

MISCELLANEOUS

The wet early summer meant that there was much less red rot than usual towards the end of the crushing season. This was particularly noticeable in the Mackay district where the susceptible Q.50 showed only slight losses. In the same district Eros showed bad infection in experimental plots.

Gumming disease, *Xanthomonas vasulorum*, was not found at Mossman during the past year but, as with other diseases, this does not yet mean that the disease has been eliminated and at least several disease-free seasons must elapse before such a conclusion is warranted.

Leaf-scald disease, *Xanthomonas albilineans*, continues to be a problem in the wetter areas of North Queensland and some heavy losses were sustained by individual farmers in the Tully and other mill areas. The losses convinced many growers who had been inclined to treat leaf-scald as a minor disease, that the disease is quite serious and several Cane Pest and Disease Control Boards in the North have already instituted surveys to find out the exact extent of the disease in their respective districts. This is regarded as a necessary preliminary before recommending sources from which clean planting material may be obtained.

The leaf-scald trial at Moggill—the first such trial to be planted there—showed very little disease possibly owing to the staleness of many of the setts which had to be brought from Cairns, more than 1,000 miles away. The trouble is to be overcome by propagating the varieties at Moggill, as was already done last year for the Fiji, red rot and gumming disease trials.

Mosaic disease was recorded as usual from the Burdekin area southwards. Further north the disease is very rare and the Burdekin may be considered the northern limit of its north the disease is very rare and for all practical purposes the Burdekin may be considered the northern limit of its range. There active control measures have virtually eliminated it from one mill area and should bring it under control in the others within a few seasons. At Bundaberg chief interest in the disease centred in an infection in Q.50 as that variety was in process of propagation throughout the district; the strict control of material used for planting has apparently been successful in preventing any widespread infection in the variety. At Moreton a mosaic loss trial planted on alluvial soil in the Rosemount Road area was harvested. It included plots of Q.28 and Q.42 planted with setts from healthy and diseased sources and was designed firstly, to demonstrate what were felt to be serious but often ignored losses in the known susceptible Q.42, and secondly, to determine losses in the variety Q.28, which at the time gave promise of becoming one of the important canes of the district. Germinations were satisfactory

in all plots but differences in vigour were observed between healthy and diseased plots in the Q.42 at about four months although not in the Q.28. Later the differences were not so marked. Mean yields at harvest at the age of $14\frac{1}{2}$ months are set out below in tons per acre:—

Variety	Type of Planting Material		
	Diseased	Healthy	Means
Q.28	40·16	41·57	40·86
Q.42	33·12	41·00	37·06
Means	36·64	41·29	38·96

The difference between "Healthy" and "Diseased" is not significant for Q.28, but for Q.42 it is significant at the one per cent. level. This difference represents a loss of one ton of sugar per acre and the trial demonstrated clearly that mosaic disease can be the cause of heavy losses in susceptible varieties.

The usual legume-culture service to cane farmers was continued during the year. Inoculum sent out included sufficient for the treatment of 272 bushels of cowpeas, 29 of Mauritius beans, 3 of lupins, and 860 lb. of Gambia pea and 100 lb. of lucerne.

QUARANTINE

The following canes which displayed no suspicious symptoms during their requisite period in the quarantine house were subsequently forwarded to the various experiment stations for further propagation and testing: P.O.J.2967, P.O.J. 3016, C.P. 36-183 and F.108 ex United States of America, Co.475 and Co.617 ex India, Tuc. 3950, Tuc. 4535 and Tuc. 4624 ex Argentina, and 36 S.N.4995, 38 S.N.473, 40 S.N.1618 and 40 S.N.5798 ex New South Wales.

In addition, the quarantine house is now occupied by the record number of thirty varieties originating from the following countries: Barbados, Fiji, Hawaii, Puerto Rico, South Africa, Taiwan, and United States of America.

Proper precautions were also taken to prevent the establishment of any pests or diseases that may inadvertently have gained entry with the 165 varieties recently introduced from New Guinea. After adequate treatment in a hot solution of a suitable fungicide, the setts were planted in an isolated quarantine area. Already one case of Fiji disease has been intercepted in this introduction.

Division of Mill Technology

By J. H. NICKLIN, Senior Technologist (Engineer), and J. L. CLAYTON, Chief Mill Technologist.

SEASONAL ACTIVITIES

Sugar Deterioration.—The major investigation during the 1950 season was that into the deterioration of raw sugar in storage and in transit. The tests included a survey of mill storage sheds, drying tests at Babinda and Mulgrave mills, rapid deterioration tests with various micro-organisms, the sampling and analysis of sugar being loaded at three ports and the spot sampling of sugar in several factories. Most of the work was of an exploratory nature and has provided information as to which aspects of the problem should receive more attention during the coming season.

Tentative Conclusions and Comments

1. The problem is very complex and inconsistencies cloud the issue, but perusal of the sugar deterioration file of the Sugar Board leads one to suspect that:—
 - (a) The sugar from certain mills was more liable to deteriorate than that from others, wherever the sugar went.
 - (b) Although the quality on out-turn of overseas sugar from those mills which experienced deterioration generally seemed to be worse than that received at local refineries, there are many instances where this does not apply and it is difficult to determine the reason for this variation. Duration of travel does not appear to be a factor.
 - other U.K. ports, irrespective of the quality of lower quality than that unloaded at
 - (c) Sugar unloaded at Liverpool was gemmill making the sugar.
 - (d) Certain ships seem to be associated with deteriorated sugar.
2. Analyses of batches of sugar at the point of loading and at the refinery are necessary, but the prevailing conditions prevent this being carried out except in regard to complete shipments of one mark.
3. No evidence has been found of the incidence of harmful organisms in raw sugar immediately before bagging, but it has been established that the sacks carry a wide variety of micro-organisms, including the harmful ones. It is therefore necessary to bag the sugar with a low moisture content and maintain it in that condition during storage and transit.
4. Owing to the time required for the sampling of a whole shipment of sugar of one mark, it follows that the number of such trials must be limited. There is, then, a distinct possibility that none of the shipments selected will contain deteriorated sugar when unloaded.
5. The dryer installations in most factories are entirely inadequate for the task required of them. Most seem to be capable of coping with the average rate of throughput of sugar, on a 24-hour basis, but they are below capacity on the basis of actual operating rate. The provision of air heating apparatus and dust separators is necessary for a satisfactory drying plant.
6. Storage sheds at many factories and ports are very poor; in some cases the sugar being protected merely from the direct rain. It is essential that factories look to their own storage sheds and alter them so that they do offer good protection from the weather.

Pilot Wax Plant.—During the last season a considerable amount of time was spent in studying the mechanical operation of the pilot wax extractor. At the outset, difficulty had been experienced with the discharge of the mud to the stripper and steps were taken to rectify this trouble. Numerous modifications were made to the central screw of the extractor, but, no matter what change was made, its operation became worse. Finally it was evident that as the inside of the uppermost section of the central pipe had become polished, there was insufficient friction between the mud and the wall to enable the mud to be lifted. Arrangements are now in hand for the design of the extractor to be substantially altered, by eliminating the internal screw and making provision for the mud to be discharged from the extractor by an external inclined scraper conveyor. It is intended to erect the plant at the Bundaberg Experiment Station and to carry out tests with it during the coming season.

Clarification Tests.—The trials using "KWK Volclay" bentonite as an aid to clarification were carried out at Fairymead mill in July and August, 1950, in conjunction with Sugar Research Ltd. While waiting for weather conditions to permit crushing on a 24-hour a day basis, the opportunity was taken to establish, in the laboratory, the desirable rate of addition of the bentonite. The recommended procedure of adding the material in the form of a 5 per cent. suspension before the addition of lime, was followed, and it was found that a rate equivalent to one pound of the dry clay per ton of cane should be used. This was the minimum quantity giving a reasonable improvement in clarification and it was considered that this rate of addition would be the highest permissible in practice from the point of view of economics. Sufficient material was available to permit the operation of the factory for one week with this procedure.

An improvement in the clarity of the juice and a decrease in mud volume were evident, but there was no improvement in the filtrability of the daily composite samples of sugar. Values of about 5 were usual, the highest being 6.3 and the lowest 2.9. There was no increase in purity rise from mixed to clarified juice, but very definite rises in apparent purity were observed, both in the limed mixed juice and the clarified juice following the addition of bentonite. The pol of the juice after treatment was higher than before and this suggested the presence of some optically active basic materials which reacted with the clay and were removed from solution.

In fact an optically active substance was recovered from the clay separated from the juice in a super-centrifuge after treatment with potassium dihydrogen phosphate.

After the actual bentonite trials efforts were made to separate the suspended matter from a 60 brix solution of raw sugar, but it was not until a 30 brix solution was used that a significant increase in filtration rate occurred. Further work on this subject has been undertaken by Sugar Research Ltd.

It was proposed that hot liming trials be conducted in the factory following the run with bentonite, but at the time the improvised methods of adding the lime after heating were not satisfactory and further time could not be spared to carry out this work.

Mill Visits.—All mills were visited at least once by a member of the Mill Technology staff, and in many cases visits were made by more than one officer. Several of the visits were unusually brief but the demands on the staff for actual investigational work were more severe than has been the case in the past.

Other Items.—Early in the season a thorough check of the process work was carried out at Mulgrave Mill at the request of the management. This work proved to be of considerable benefit in connection with extra equipment required by the expansion programme.

Special visits were also made to Cattle Creek mill, where the boiling of final massecuites in an oval coil pan was investigated and to Farleigh mill where a check was made on the factory control.

ENGINEERING TECHNOLOGY

Bagasse Nuisance Investigations.—Suitable apparatus was assembled during the slack season and tests were carried out during the crushing at Plane Creek, Proserpine, Tully, Babinda, and Millaquin factories. After the initial experience at Plane Creek it was decided that most satisfactory sampling could be obtained from the stack at a point some distance above the base. This necessitated the rigging of temporary platforms and the provision of access holes.

The experimental procedure and conclusions reached from the tests are covered in a paper by Mr. Yore mentioned earlier in this Report. To summarise briefly it may be said that complete elimination of the nuisance could only be obtained by the use of a suitable arrester and that, of the several types of arrester available, an inertia type consisting of a number of large cyclones would probably be the most economical proposition for sugar factories. At the same time the nuisance can be considerably relieved by the use of water sprays and/or by the provision of large furnace volumes. Excellent results from the point of view of both bagasse nuisance and efficient steaming have been obtained with the large furnaces at Proserpine.

Boiler Operation.—The opportunity was taken from time to time during the bagasse nuisance investigations to study boiler operation and from this it would appear that, for the two types of grate which make up the large majority of Queensland installations, very different conditions as regards air supply must be established if reasonable efficiency is to be obtained. There is a tendency to allow too much air into the furnace with sloping grates and too small an amount with flat grates. The correct amount can be determined only with a flue gas analyser.

Electrical.—Visits of a few days' duration were made to three factories for the purpose of discussing electrical matters, mainly the most suitable method of distribution. A design and specification covering the switchboard extensions required to control a 1,500 kw turbo-alternator was submitted to and adopted by a southern factory. Three large switchboards to Bureau designs are now being constructed in Brisbane, and, at the request of the factories concerned, visits were made to the manufacturers' workshops for the purpose of answering any queries and checking up on the progress of the work.

ROUTINE OPERATIONS AND SLACK SEASON INVESTIGATIONS

Mutual Control Scheme.—The distribution of chemical control figures to participants in the Mutual Control was continued throughout the 1950 season. For the first time Pioneer and Inkerman mills contributed their figures, and it is understood that Mourilyan mill will enter the group in 1951. Thus all mills in Queensland, except those operated by C.S.R. Company, and Rocky Point, will be included in the Mutual Control system. The distribution of returns to the mills during 1950 became rather irregular as the season progressed owing to shortage of staff and unusual activity associated with the International Conference. At the meeting of the Mill Research Programme Committee in April, 1951, plans were laid for prompt distribution of figures on a weekly basis.

The Annual Synopsis of Chemical Control Figures is in the hands of the printer, and the Plant Data Record for the 1950 season, which is to be reprinted in full, is in course of preparation.

Apparatus Testing.—During the year the following apparatus was tested: 489 brix spindles, 19 flasks, 16 pipettes, 16 polariscope tubes, 4 thermometers, 2 sets of analytical weights, 2 analytical balances, 4 new polariscopes, 1 saturation cell, 1 quartz plate, and 1 pH meter. In addition, 5 polariscopes were cleaned, overhauled, and tested.

A range of "Green Line" Class A volumetric glassware was examined and tested, and found to be according to the manufacturer's specification. A general certificate of approval was issued for this brand of apparatus.

Properties of Molasses.—Early in 1951, work on the flow properties of molasses and massecuites was resumed, using both the viscometer designed by the Bureau and a "Technico" torsion wire instrument. As the result of these investigations the Technico viscometer was found to be very suitable for testing the viscosity of molasses, but unsuitable for massecuites unless a

new technique of operation can be devised. A new type of formula was developed for conversion of the readings of the Technico instrument to absolute viscosity. Some conflicting claims as to the influence of crystal size and quantity on the viscosity of massecuite remain to be investigated. A report on this work was submitted in the form of a paper by B. G. Adkins presented to the 1951 Conference of the Queensland Society of Sugar Cane Technologists.

Magnesium Oxide.—Extensive tests have been made with magnesium oxide as a clarifying agent. At first a proprietary clarifying agent was used, but later, methods were devised for preparing the oxide in suitable form, first from pure chemicals, and later from natural magnesite.

Whilst the use of this material has yielded spectacular results in the laboratory it is very difficult on this basis to postulate either the performance or the economics of the full scale process. It is hoped that, during the 1951 season, trials will be conducted in one of the smaller mills on a factory scale.

Vacuum Pans.—Following the issue of a circular to mills offering advice on the design of vacuum pans, the Bureau has been consulted on most of the designs since drawn up. A group of new coil pans designed according to the specifications of the Bureau will come into service in 1952, whilst a calandria pan designed by the Bureau is scheduled for installation during the 1951 season.

FACTORY OPERATIONS, 1950 SEASON

The 1950 season was remarkable as being one of the wettest on record. The crushing period which usually coincides with the drier months of the year was interrupted consistently by heavy rain. Such weather, combined with a record yield of cane, caused the season to be prolonged far beyond normal limits, and even then a considerable quantity of cane could not be treated and was stood over to 1951.

The record crop of 6,691,706 tons of cane actually crushed yielded only 879,844 tons of 94 n.t. sugar which is appreciably below the production for 1949, and about 30,000 tons below the record set in 1948. When attention was drawn, in the previous Annual Report, to the unusually high quality ratio of 7.26 it was never suspected that the 1950 season would yield a ratio of 7.61 tons of cane per ton of 94 n.t. sugar, the highest recorded since 1924. This sharp rise in quality ratio, to a value far above any recorded in the previous 20 years or more, doubtless resulted mainly from the very mild winter and heavy rainfall, combined with varieties which apparently respond to such conditions by making lush growth at a relatively low sugar content.

For details of performance as to the various mills and districts reference should be made to the accompanying Tables. A study of Table X shows that the production of cane was high in all districts, though not outstanding in the Central district as compared with the crops of the two previous years. In this district also, the yield of sugar per ton of cane was not abnormally depressed.

As stated earlier the crushing season was prolonged and operations were frequently interrupted. The crop days for the season (Table XVI) rose to the extremely high figure of 6469, whilst the actual crushing operations occupied only 57.6 per cent. of this total. Table XVII shows that time lost due to lack of cane supply was abnormally high and furthermore voluntary shut-downs added significantly to the idle time.

Faced with enormous crops and unavoidable interruptions the mills set new records in crushing rate. As shown in Table XVI the average rate rose to 72.35 tons of cane per hour, and the rise was common to all districts. It is interesting to note that in spite of this the extraction figures (Table XIII) were well maintained, the average figures for pol extraction and reduced extraction lying slightly above those for 1949. The suggestion made in the previous Annual Report that the peak of extraction has been passed over still appears to be correct, but the influx of new equipment now materialising will doubtless restore the balance in the near future.

Despite changes in policy on the matter of sugar quality the average polarization of the raws has remained quite steady of recent years. Since 1947 the average annual polarizations have been 98.75, 98.77, 98.75, and 98.68. The slightly lower figure for 1950 probably results from a general effort to hold polarizations below the 99 degree limit.

It is pleasing to record that the downward trend of purity of final molasses still continues. All districts recorded true purities below 46, and the State average was 45.45. Even this figure does not represent the limit, as some mills now, thanks to improved equipment and proper supervision, are able to achieve true purities below 40 regularly. For years now the Bureau has emphasised the need and the room for improvement in molasses purities and it is to be hoped that the present trend of results will be maintained.

The fuel figures, set out in Table XVIII, show a high consumption of total fuel in all districts, as might be expected from the intermittent crushing. Fortunately the supply of bagasse for fuel was also above normal, and therefore the use of added fuel was quite moderate. The added fuel figures for the central and southern districts were particularly low.

On the whole the 1950 season was not satisfying. The poor yield of sugar from the cane, the prolonged crushing season, and the high pressure of operations while crushing was proceeding placed a heavy strain upon the mill staffs. Since the end of this season a considerable quantity of new equipment has been installed in the factories and further big deliveries are scheduled for the 1951-52 slack season. If faced with a crop of 1950 proportions again the mills will be found much better fitted to deal with it in a reasonable time and with higher efficiency.

TABLE X.

PRODUCTION DATA FOR THE QUEENSLAND SUGAR INDUSTRY FOR THE SEASONS 1944 TO 1950, INCLUSIVE.
(TOTALS AND WEIGHTED AVERAGES.)

NORTHERN DISTRICT.*

—	1944	1945	1946	1947	1948	1949	1950
Cane—							
Tons	1,819,552	1,943,613	1,551,959	1,876,137	2,478,083	2,426,929	2,622,402
Pol per cent.	15·69	15·56	16·68	14·81	15·55	15·50	14·40
Fibre per cent.	10·39	10·51	10·57	10·62	10·55	10·58	10·35
C.C.S.	14·64	14·47	15·54	13·66	14·39	14·36	13·21
Purity first expressed juice	90·38	89·75	90·08	88·60	89·24	89·17	87·81
Sugar—							
Tons (94 net titre)	259,573	281,998	233,732	255,958	356,969	345,684	344,944
Cane per ton sugar	7·01	6·89	6·64	7·33	6·94	7·02	7·60
Pol per cent.	98·67	98·59	98·70	98·48	98·60	98·42	98·47
Net titre	97·42	97·26	97·45	96·91	97·24	96·99	97·12
Dilution indicator	28·50	31·44	28·90	33·00	30·00	30·00	29·00
Pol per cent. pol cane	86·49	86·72	85·65	84·89	86·60	84·59	85·29
Mud—							
Tons	32,285	31,614	26,009	33,152	37,485	42,450	46,765
Mud per cent. cane	2·98	2·93	3·04	2·85	2·67	3·12	3·10
Pol per cent.	4·75	4·57	3·80	3·41	3·93	3·59	3·66
Pol per cent. pol cane	0·90	0·86	0·69	0·66	0·67	0·72	0·79
Molasses—							
Gallons	4,174,420	4,415,061	3,979,612	5,065,600	6,087,150	6,142,636	6,737,260
Gallons per ton cane	3·86	4·09	4·66	4·36	4·33	4·51	4·48
Brix	84·71	87·14	85·92	86·74	86·40	86·57	86·36
Apparent purity	35·83	35·32	36·18	32·41	33·01	34·15	30·93
True purity	48·25	47·80	48·92	..	46·47	47·78	44·73
Reducing sugars	14·72	16·56	14·88	17·50	18·28	17·96	20·97
Pol per cent. pol cane	4·81	5·28	5·52	5·35	5·23	5·68	5·36
Final Bagasse—							
Tons	235,132	234,022	194,494	258,536	308,282	308,622	335,620
Bagasse per cent. cane	21·72	21·68	22·75	22·34	21·93	22·68	22·26
Pol per cent.	2·79	2·72	3·03	2·45	2·86	3·12	3·04
Dry substance	51·45	51·62	50·40	51·04	51·70	50·70	50·49
Pol per cent. pol cane	3·87	3·79	4·13	3·68	4·04	4·75	4·70
Undetermined loss—							
Pol per cent. pol cane	3·93	3·35	4·01	5·42	3·46	4·26	3·86
Fuels—							
Tons wood	6,353	11,143	10,291	7,389	5,378	5,702	8,768
Tons coal	..	..	..	16·00	..	..	..
Tons molasses	12,144	9,951	5,232	9,057	10,691	8,436	16,691

* The figures for tons of cane, tons of sugar, and tons of cane per ton of sugar refer to all mills. All others exclude C.S.R. Co. mills.

CENTRAL DISTRICT.†

—	1944	1945	1946	1947	1948	1949	1950
Cane—							
Tons	1,700,451	1,699,803	1,716,764	1,380,368	2,572,089	2,691,364	2,580,013
Pol per cent.	16·87	15·83	15·21	16·44	15·98	15·41	14·96
Fibre per cent.	12·07	12·34	11·34	12·16	12·67	12·10	12·68
C.C.S.	15·81	14·79	13·69	15·36	14·76	14·11	13·93
Purity first expressed juice	90·98	90·48	85·64	90·59	88·85	87·59	89·60
Sugar—							
Tons (94 net titre)	262,254	242,673	227,754	204,780	373,003	375,654	355,751
Cane per ton sugar	6·48	7·00	7·54	6·74	6·90	7·16	7·25
Pol per cent.	98·91	98·93	98·87	98·91	98·83	98·96	98·74
Net titre	97·77	97·80	97·63	97·57	97·62	97·91	97·25
Dilution indicator	26·95	24·58	27·16	30·00	28·00	33·00	29·00
Pol per cent. pol cane	86·94	85·75	82·96	85·94	86·46	86·27	86·73
Mud—							
Tons	66,339	64,449	70,807	49,767	83,008	86,934	81,414
Mud per cent. cane	3·91	3·79	4·12	3·61	3·23	3·23	3·15
Pol per cent.	1·85	1·78	2·15	1·88	2·27	2·67	2·67
Pol per cent. pol cane	0·43	0·43	0·58	0·41	0·46	0·56	0·55
Molasses—							
Gallons	7,474,610	7,902,266	11,146,914	6,777,400	13,828,230	15,387,153	10,680,743
Gallons per ton cane	4·40	4·65	6·69	4·91	5·38	5·72	4·14
Brix	87·36	87·46	88·02	88·32	88·83	88·73	88·57
Apparent purity	37·36	38·99	34·44	37·69	35·40	34·11	36·17
True purity	47·20	48·71	45·68	..	46·56	45·40	45·74
Reducing sugars	14·34	13·54	23·81	14·57	17·30	19·97	16·19
Pol per cent. pol cane	5·55	6·54	8·44	6·51	7·05	7·37	5·73
Final bagasse—							
Tons	435,253	437,701	426,219	344,687	657,839	697,490	668,330
Bagasse per cent. cane	25·60	25·75	24·82	24·97	25·58	25·91	25·89
Pol per cent.	2·91	2·67	3·03	2·62	2·58	2·67	2·37
Dry substance	50·22	51·43	49·71	52·14	52·99	50·99	51·48
Pol per cent. pol cane	4·42	4·34	4·94	3·97	4·12	4·49	4·04
Undetermined loss—							
Pol per cent. pol cane	2·66	2·94	3·08	3·17	1·91	1·31	2·95
Fuels—							
Tons wood	11,422	7,240	15,322	4,988	9,315	8,576	10,140
Tons coal	642	514	637	271	244	743	528
Tons molasses	1,152	1,299	1,083	..	40	98	18

† 1944-49 fuel figures exclude Pioneer and Inkerman.

TABLE X.—*continued.*
SOUTHERN DISTRICT.

—	1944	1945*	1946†	1947	1948	1949	1950
Cane—							
Tons	878,187	908,566	445,752	894,482	1,383,384	1,399,749	1,489,291
Pol per cent.	15·35	14·84	13·23	14·31	14·58	14·07	13·50
Fibre per cent.	13·39	13·97	13·47	14·68	14·23	14·80	14·96
C.C.S.	14·20	13·63	11·54	13·01	13·28	12·83	12·32
Purity first expressed juice	89·15	88·17	81·18	88·05	86·95	87·10	87·10
Sugar—							
Tons (94 net titre)	121,713	119,918	50,600	110,920	180,077	175,929	179,149
Cane per ton sugar	7·22	7·58	8·81	8·07	7·68	7·96	8·31
Pol per cent.	99·08	99·09	98·72	99·06	99·10	98·90	98·80
Net titre	97·92	97·95	97·02	96·96	97·96	97·08	97·33
Dilution indicator	26·13	27·79	26·73	25·00	28·00	33·00	34·00
Pol per cent. pol cane	85·90	86·33	81·99	83·86	85·04	85·34	85·32
Mud—							
Tons	31,966	34,716	15,601	30,515	40,951	42,597	52,451
Mud per cent. cane	3·64	3·90	3·69	3·39	3·10	3·09	3·66
Pol per cent.	2·50	3·59	3·20	2·55	3·10	2·99	2·53
Pol per cent. pol cane	0·59	0·94	0·89	0·61	0·65	0·66	0·69
Molasses—							
Gallons	3,837,677	4,139,049	3,204,205	4,506,000	7,242,457	6,825,754	6,743,510
Gallons per ton cane	4·37	4·56	7·14	5·13	5·25	4·88	4·53
Brix	89·19	88·62	88·06	88·58	89·47	89·16	90·75
Apparent purity	38·72	39·15	34·60	38·70	37·40	38·48	37·60
True purity	46·98	47·20	45·04	..	46·39	46·80	45·57
Reducing sugars	11·21	11·08	19·59	13·05	15·35	13·95	14·68
Pol per cent. pol cane	6·47	7·13	11·04	7·85	7·93	7·85	7·55
Final bagasse—							
Tons	243,681	267,213	126,496	257,705	397,317	416,113	437,610
Bagasse per cent. cane	27·71	29·41	29·20	29·22	29·02	30·22	30·56
Pol per cent.	2·14	2·17	2·14	1·94	2·02	1·95	1·95
Dry substance	51·15	50·20	41·41	51·07	51·98	52·01	51·40
Pol per cent. pol cane	3·87	4·39	4·38	3·87	4·01	4·20	4·42
Undetermined loss—							
Pol per cent. pol cane	3·17	1·21	1·70	3·81	2·37	1·95	2·02
Fuels—							
Tons wood	11,044	10,351	9,532	4,421	5,925	5,558	3,870
Tons coal	602	411	1,001	513	77	88	351
Tons molasses	..	..	..	..	..	..	..

* In 1945, Mud figures exclude Rocky Point and Fuel figures exclude Maryborough.

† In 1946, Mount Bauple is excluded from Mud and Fuel figures and Rocky Point from all except Tons Cane, Tons Sugar, Tons Cane per ton Sugar and Fuel figures.

In 1950, Mount Bauple excluded from all figures except Tons Cane and Sugar.

ALL QUEENSLAND DISTRICTS.

—	1944	1945	1946	1947	1948	1949	1950
Cane—							
Tons	4,398,190	4,551,982	3,714,475	4,150,987	6,433,556	6,518,042	6,691,706
Pol per cent.	16·15	15·51	15·33	15·34	15·51	15·09	14·52
Fibre per cent.	11·90	12·21	11·44	12·28	12·51	12·41	12·52
C.C.S.	15·07	14·41	13·89	14·18	14·28	13·85	13·40
Purity first expressed juice	90·35	89·70	86·23	89·26	88·47	87·86	88·43
Sugar—							
Tons (94 net titre)	643,540	644,661	512,086	571,658	910,049	897,267	879,844
Cane per ton sugar	6·83	7·06	7·25	7·26	7·07	7·26	7·61
Pol per cent.	98·88	98·86	98·80	98·81	98·83	98·81	98·68
Net titre	97·70	97·67	97·36	97·50	97·60	97·75	97·22
Dilution indicator	27·34	27·75	27·66	30·00	29·00	31·00	30·00
Pol per cent. pol cane	86·57	86·17	83·67	85·11	86·16	85·62	86·00
Mud—							
Tons	130,590	130,779	112,417	113,434	161,444	171,981	180,630
Mud per cent. cane	3·57	3·56	3·75	3·31	3·02	3·17	3·27
Pol per cent.	2·78	2·93	2·68	2·51	2·86	2·97	2·88
Pol per cent. pol cane	0·60	0·67	0·66*	0·54	0·56	0·62	0·65
Molasses—							
Gallons	15,486,707	16,456,376	18,330,731	16,349,000	27,157,837	28,355,543	24,161,513
Gallons per ton cane	4·23	4·46	6·07	4·78	5·07	5·22	4·33
Brix	87·10	87·67	87·58	87·91	88·46	88·36	88·55
Apparent purity	37·28	38·05	34·84	36·35	35·40	35·17	35·10
True purity	47·43	48·09	46·26	..	46·49	46·22	45·36
Reducing sugars	13·77	13·73	21·18	15·17	16·95	17·84	17·19
Pol per cent. pol cane	5·55	6·30	7·85	6·45	6·78	7·05	6·07
Final bagasse—							
Tons	914,066	938,936	747,209	860,928	1,363,438	1,422,225	1,441,560
Bagasse per cent. cane	24·97	25·46	24·86	25·16	25·50	26·20	26·11
Pol per cent.	2·75	2·54	2·87	2·36	2·48	2·56	2·40
Dry substance	50·80	51·13	49·86	51·49	52·41	51·25	51·23
Pol per cent. pol cane	4·13	4·17	4·62	3·85	4·07	4·49	4·31
Undetermined loss—							
Pol per cent. pol cane	3·15	2·69	3·20	4·05	2·43	2·22	2·97
Fuels—							
Tons wood	28,819	28,734	35,145	16,798	20,618	19,836	22,778
Tons coal	1,244	925	1,638	800	321	1,150	879
Tons molasses	13,296	11,250	6,315	9,057	10,731	8,534	16,709

Tons of Cane, Tons Sugar, and Tons Cane per ton Sugar include all mills. All other figures exclude C.S.R. Mills only, except—

(1) In 1945, Mud figures exclude Rocky Point and Fuel figures exclude Maryborough.

(2) In 1946, Mount Bauple is excluded from Mud and Fuel figures and Rocky Point from all except Tons Cane, Sugar, Tons Cane per ton Sugar and Fuel figures.

(3) In 1950, Fuel figures include Pioneer and Inkerman; in previous years these were excluded.
Mount Bauple excluded from all except Tons Cane and Sugar.

TABLE XI.

SUGAR PRODUCED, IN DISTRICTS, 1950 SEASON WITH PEAK ALLOCATIONS.

District								Tons 94 N.T. Sugar			Production % Peak
								Produced	Peak	Excess Production over Peak	
Northern	..	..	..	..	..	..	..	344,944	380,700	— 35,756	90·61
Central	..	..	..	..	..	..	..	355,751	360,300	— 4,549	98·74
Southern	..	..	..	..	..	..	..	179,149	175,900	+ 3,249	101·82
All Districts	..	..	..	..	..	..	..	879,844	916,900	— 37,056	95·96

TABLE XII.

TONS CANE PER TON 94 NET TITRE SUGAR, 1941-1950.

Season	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Tons Cane per ton Sugar	6·87	7·18	6·98	6·83	7·06	7·25	7·26	7·07	7·26	7·61

TABLE XIII.

FIGURES FOR 1950 SEASON (TOTALS AND ARITHMETIC AVERAGES).

	Northern	Central	Southern	All Districts
Tons cane crushed	2,622,402	2,580,013	1,489,316	6,691,706
Tons 94 net titre sugar made	344,944	355,751	179,149	879,844
Net titre of sugar	97·115	97·255	97·235	97·212
Tons cane per ton 94 n.t. sugar	7·77	7·26	8·28	7·69
C.C.S. of cane	13·23	14·17	12·43	13·42
Coefficient of work	97·47	97·32	97·39	97·38
Coefficient of work E.S.G.	92·49	92·54	92·63	92·56
Crushing rate	85·11	76·28	57·51	72·35
Lost time	13·92	21·36	15·08	17·61
Fibre per cent. cane	10·44	12·61	15·09	12·87
Pol per cent. cane	14·42	15·20	13·61	14·53
First expressed juice—				
Brix	19·40	20·35	19·52	19·88
Purity	87·84	89·97	87·26	88·64
Purity—				
Clarified juice	87·61	88·79	86·92	87·94
Syrup	87·45	88·84	86·99	87·91
Clarified juice per cent. cane	99·00	105·00	104·00	103·00
Dilution per cent. first expressed juice	22·20	34·49	37·35	32·67
Final Bagasse—				
Pol	3·05	2·43	2·06	2·46
Dry substance	50·69	51·50	51·77	51·40
Pol extraction	95·28	95·87	95·34	95·57
Reduced extraction	94·19	95·85	96·34	95·62
Final molasses—				
Gallons per ton	4·48	4·14	4·51	4·32
Brix	85·83	88·30	89·55	88·11
Apparent purity	31·31	36·10	37·85	35·53
True purity	45·14	45·62	45·49	45·45
Reducing sugars	21·02	16·10	14·65	16·91
Final mud—				
Per cent. cane	3·09	3·16	3·57	3·27
Pol per cent. mud	4·04	3·02	2·85	3·20
Sugar—				
Pol	98·469	98·743	98·754	98·684
Reducing sugars	·539	·310	·231	·338
Ash	·163	·236	·258	·226
Moisture	·334	·283	·315	·304
Dilution indicator	28·00	29·00	34·00	30·00
Pol balance—				
Sugar (recovery)	85·17	86·63	84·94	85·77
Bagasse loss	4·72	4·13	4·66	4·43
Molasses loss	5·52	5·72	7·38	6·18
Mud loss	·80	·55	·70	·65
Undetermined loss	3·79	2·97	2·32	2·97
Boiling house efficiency	94·61	94·58	94·61	94·60
Boiling house efficiency E.S.G.	94·19	94·22	94·26	94·22
Fuels (calculated as equivalent bagasse per cent. cane)—				
Wood	1·05	·76	·69	·81
Coal	·00	·05	·06	·04
Molasses	1·88	·00	·00	·43
Total added	2·93	·81	·75	1·28
Bagasse	24·47	29·73	35·29	30·23
Total fuel	27·40	30·54	36·04	31·51
Crop days	2,146·0	2,518·3	1,804·8	6,469·1

TABLE XIV.

AVERAGE PERFORMANCE OF QUEENSLAND MILLS, EXCLUDING C.S.R. COY.'S MILLS. (ARITHMETIC AVERAGES).

	Northern		Central		Southern		All Districts	
	1949	1950	1949	1950	1949	1950	1949	1950
Cane—								
Pol	15·60	14·42	15·46	15·20	14·12	13·61	15·01	14·53
Fibre	10·62	10·44	12·14	12·61	14·73	15·09	12·74	12·87
Purities—								
First expressed juice	89·31	87·84	87·64	89·97	87·11	87·26	87·84	88·64
Clarified juice	88·78	87·61	85·83	88·79	86·52	86·92	86·79	87·94
Syrup	88·93	87·45	85·68	88·84	86·79	86·99	86·86	87·91
Molasses—								
Gallons per ton cane	4·56	4·48	5·84	4·14	4·89	4·51	5·24	4·32
Apparent purity	34·58	31·31	34·28	36·10	38·47	37·85	35·74	35·53
Recovery overall	84·60	85·17	86·28	86·63	84·42	84·94	85·29	85·77
Recovery overall E.S.G.	84·19	84·78	86·00	86·30	84·14	84·63	84·97	85·43
Recovery on mixed juice	88·84	89·36	90·25	90·36	88·58	89·09	89·36	89·74
Recovery on mixed juice E.S.G. ..	88·41	88·97	89·96	90·01	88·21	88·75	89·04	89·38
Boiling house efficiency	93·32	94·61	95·67	94·58	94·09	94·61	94·64	94·60
Boiling house efficiency E.S.G. ..	92·87	94·19	95·36	94·22	93·77	94·26	94·27	94·22
Pol extraction	95·22	95·28	95·59	95·87	95·36	95·34	95·43	95·57
Reduced extraction	94·27	94·19	95·43	95·85	96·19	96·34	95·43	95·62
C.C.S. in cane	14·47	13·23	14·17	14·17	12·89	12·43	13·78	13·42
Coefficient of work	95·81	97·47	99·06	97·32	97·14	97·39	97·70	97·38
Coefficient of work E.S.G.	90·79	92·49	93·88	92·54	92·28	92·63	92·66	92·56

TABLE XV.
CANE MILLED AND SUGAR YIELDED, 1950.

Mills	Tons Cane Crushed	Tons 94 n.t. Sugar made	Tons Cane per ton 94 n.t. sugar	
			1950	1949
Mossman	155,340	19,713	7·880	6·651
Hambledon	225,424	32,794	6·874	6·504
Mulgrave	282,662	38,898	7·267	7·301
Babinda	260,269	31,267	8·324	7·689
Goondi	210,358	25,705	8·184	7·538
South Johnstone	292,573	36,901	7·929	7·336
Mourilyan	195,575	25,899	7·551	7·266
Tully	320,751	41,796	7·674	7·216
Victoria	352,072	47,860	7·356	6·698
Macknade	327,378	44,097	7·424	6·568
Local Sales	..	14	..	..
Northern District Totals and Averages	2,622,402	344,944	7·602	7·021
Invicta	113,596	16,847	6·743	6·640
Pioneer	238,159	33,967	7·011	6·727
Kalamia	253,758	36,997	6·859	6·621
Inkerman	277,827	39,362	7·058	7·037
Proserpine	238,126	33,271	7·157	6·963
Cattle Creek	110,752	14,852	7·457	7·206
Racecourse	263,393	35,419	7·436	7·475
Farleigh	250,307	33,160	7·548	7·471
North Eton	137,825	18,886	7·298	7·461
Marian	236,020	31,556	7·479	7·486
Pleystowe	264,988	35,462	7·472	7·443
Plane Creek	195,262	25,880	7·545	7·332
Local Sales	..	92	..	..
Central District Totals and Averages	2,580,013	355,751	7·252	7·164
Qunaba	123,563	13,968	8·846	8·237
Millaquin	261,989	31,257	8·382	7·896
Bingera	264,963	31,763	8·342	7·720
Fairymead	235,259	27,630	8·515	7·967
Gin Gin	83,540	9,782	8·540	8·607
Isis	251,969	31,349	8·038	7·909
Maryborough	85,922	11,050	7·776	7·756
Mount Bauple	40,271	4,533	8·884	8·145
Moreton	124,029	15,958	7·772	7·858
Rocky Point	17,786	1,810	9·827	9·545
Local Sales	..	49	..	..
Southern District Totals and Averages	1,489,291	179,149	8·313	7·956
All Districts, Totals and Averages	6,691,706	879,844	7·605	7·264

TABLE XVI.

AVERAGE CRUSHING RATES, 1941-1950, EXCLUDING C.S.R. COY.'S AND ROCKY POINT MILLS.
(ARITHMETIC AVERAGES).

—	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Tons Cane per Hour	63·32	55·93	55·45	57·33	59·32	59·48	60·55	66·33	68·74	72·35

TOTAL CROP DAYS.

—	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Total Crop Days ..	4,034	4,432	4,270	4,749	4,872	3,740	4,289	5,708	5,593	6,469

TABLE XVII.

ANALYSIS OF GROSS TIME FOR SEASON 1950. (EXCLUDING C.S.R. COY.'S MILLS).

—	Total Hours	Per Cent. Gross Total Hours	Per Cent. Available Hours
Crushing Time	76,427·15	57·62	81·83
Lost Time—			
Manufacture	3,812·29	2·88	4·08
Cane Supply	13,163·35	9·92	14·09
Total Available Time	93,402·79	70·42	100·00
Premeditated and Week-end Stops	39,235·62	29·58	..
Gross Total Hours	132,638·41	100·00	..

TABLE XVIII.

FUEL CALCULATED AS EQUIVALENT BAGASSE* PER 100 CANE. (ARITHMETIC AVERAGES.)

Year	Wood	Coal, &c.	Molasses	Total Added	Bagasse	Total
NORTHERN DISTRICT.						
1941	1·230	..	·768	1·998	21·390	23·388
1942	1·243	..	2·276	3·519	21·637	25·156
1943	1·410	..	2·224	3·634	23·182	26·816
1944	1·063	..	1·770	2·833	22·633	25·466
1945	1·830	..	1·552	3·382	23·021	26·403
1946	2·287	..	1·088	3·375	22·858	26·233
1947	1·167	·005	·913	2·085	22·988	25·073
1948	·672	..	1·535	2·207	23·063	25·270
1949	·726	..	1·102	1·828	23·242	25·070
1950	1·050	..	1·878	2·928	24·468	27·396
CENTRAL DISTRICT.						
1941	1·106	·047	·295	1·448	24·837	26·285
1942	1·224	·046	·217	1·487	26·254	27·741
1943	2·589	·189	·198	2·976	26·163	29·139
1944	1·995	·131	·180	2·306	27·061	29·367
1945	1·372	·092	·326	1·790	28·144	29·934
1946	2·730	·132	·132	2·994	25·183	28·177
1947	1·487	·025	·019	1·531	28·068	29·599
1948	1·617	·037	·002	1·656	28·497	30·153
1949	·899	·153	·005	1·057	27·397	28·454
1950	·763	·053	·001	·817	29·731	30·548
SOUTHERN DISTRICT.						
1941	2·659	·045	..	2·704	28·612	31·316
1942	3·197	·183	..	3·380	30·325	33·705
1943	5·385	·380	..	5·765	29·358	35·123
1944	4·306	·151	..	4·457	29·326	33·783
1945	3·565	·059	..	3·624	30·550	34·174
1946	5·693	·697	..	6·390	29·341	35·731
1947	3·785	·141	..	3·926	30·388	34·314
1948	1·977	·009	·012	1·998	31·010	33·008
1949	1·633	·016	..	1·649	32·138	33·787
1950	·694	·060	..	·754	35·285	36·039
ALL QUEENSLAND DISTRICTS.						
1941	1·695	·035	·302	2·032	25·369	27·401
1942	1·939	·084	·633	2·656	26·612	29·268
1943	3·313	·212	·613	4·138	26·598	30·736
1944	2·603	·107	·497	3·207	26·814	30·021
1945	2·218	·058	·524	2·800	27·781	30·581
1946	3·516	·270	·341	4·127	25·842	29·969
1947	2·238	·062	·226	2·526	27·684	30·210
1948	1·519	·018	·374	1·911	28·098	30·009
1949	1·122	·067	·266	1·455	28·106	29·561
1950	·808	·043	·434	1·285	30·225	31·510

* Equivalent bagasse = bagasse with net calorific value of 3,300 B.Th.U. per lb.



Watson, Ferguson & Company
South Brisbane

